UNIVERSITY OF ALBERTA

Health, Wholeness, and the Land:
Gitksan Traditional Plant Use and Healing

By

Leslie Main Johnson ©

A Dissertation Submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of Doctor of
Philosophy

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Health, Wholeness, and the Land: Gitksan Traditional Plant Use and Healing submitted by Leslie Main Johnson in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Anthropology.

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ABSTRACT

The Gitksan are a Northwest Coast people who live in the drainage of the Skeena River in Northwestern British Columbia, Canada. This dissertation is an examination of the traditional plant uses of the Gitksan, especially for foods and medicines. I have framed the inquiry into Gitksan use of plants for medicines and foods in the broader context of Gitksan notions of wellness, illness, and the place of humans in the world, and in terms of phytochemistry, pharmacology and nutrient values as understood by Western science.

Gitksan ethnoecology differs from scientific classification, and resource knowledge seems to be keyed to specific sites on traditional territories.

A composite picture of Gitksan plant use in the period from the mid-19th century to recent decades, including use of plants for foods, medicines, technology, ritual, and in traditional narrative, is presented.

Gitksan plant classification is roughly hierarchical. "Life forms" with a number of subordinate types include trees; 'plants'; and berry plants. Grass or hay; 'leaves', or herbaceous plants; 'flowers'; moss; and fungi; are residual taxa. Eighty-nine distinct generics have been documented. A mixture of morphologic and utilitarian characters seem to underlie the system of plant classification.

For the Gitksan health is seen holistically, and is a consequence of a balanced and disciplined life and respect for other entities. Disease results from a lack of balance, or from the malevolent actions of other people or spirits. Cleansing and restoration of balance are important indigenous healing concepts. **Halayt** formerly healed disease which had a spiritual causation, while many ailments were treated with herbal remedies.

I have used the methodology of Browner *et al*. (1988) and consensus analysis to evaluate the likely empirical efficacy of Gitksan medicinal plant uses from a physiological perspective. Thirty-four of thirty-seven medicinal plants were used by at least one other indigenous group. Uses of eleven of 37 medicinal plant were supported by phytochemical data and bioassays; of these, seven were those most frequently mentioned by Gitksan people.

Limitations of biobehavioural analysis include incommensurability of Gitksan and biomedical concepts, and the difficulty of dealing with spiritual factors in biobehavioural analysis.

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Chapter One

Introduction

Why do people choose certain plants from their environment for food or for medicines? What factors influence the choices made by different peoples and cultures? Certainly ecology and environment play a part. If plants are not present in an environment (or obtained through trade), they cannot be used. But a plant which is highly valued for medicine by one group of people may be entirely ignored by another, even when available in both areas. This is also true of food plants. What other factors operate in these choices? These types of questions direct my research on the ethnobotany of the Gitksan people of northwestern British Columbia.

This study focuses on the ethnobotany and medical anthropology of the Gitksan. In order to place use of plants for medicines and for foods in context, I have explored a nexus of issues including concepts of health and healing, traditional healing practices and approaches, the relationship of the Gitksan people to their environment, and indigenous classification of plants, along with documentation of uses, identification, and naming of plants. I present both indigenous reasoning and understandings of healing, the nature of plants, and the relationship of humans to the rest of the world; and Western scientific understandings of disease process, human physiology and pharmacological properties of plant and animal medicines. I have compared these perspectives in a biobehavioural analysis (cf. Etkin 1986) of Gitksan medicinal plant use, showing the benefits and limitations of this analytical approach. I have also discussed modern syncretism in health practices and beliefs, and historical and modern health status of the Gitksan to further inform the discussion of Gitksan traditional medicine and healing practices.

The Gitksan are a Northwest Coast people who speak a Tsimshianic language related to Coast Tsimshian and Nisga'a. As they live in the drainage of the Skeena River (Fig. 1-1), their ecological setting is riverine rather than strictly coastal, although the dense forests and prevalence of salmon create similarities to the environment of coastal British Columbia. Gitksan territory is mountainous, and slopes are densely clothed in coniferous forests dominated by coastal western hemlock and red cedar in the southern part of their range, and by spruce in more northerly sections. Valley bottoms, particularly in the Hazelton area, are dominated by a mosaic of mixed coniferous and deciduous forests, with widespread aspen and birch, and post-fire stands of lodgepole pine. Today this landscape is dotted with cleared fields and farms as well as scattered settlements of Eurocanadians, along with the traditional Gitksan villages. In the Hazelton area, Gitksan territory abuts the Wet'suwet'en settlement of Hagwilget.

Traditional subsistence was a mixture of fishing, hunting and gathering, with summer dispersal and winter aggregation in large, permanent villages. Modern residence is primarily in one of six villages along the central portion of the Skeena River and two of its tributaries, the Kitwanga and Kispiox Rivers (Figure 1-1), which are approximately in the same areas as precontact winter villages, and in adjacent towns and cities. In the recent past two villages further north on the Skeena River were also occupied.

The Study

The present study examines Gitksan use of plants, especially for healing, and traditional approaches to healing, in the context of Gitksan ecology and cosmology.

This dissertation is an outgrowth of work on Gitksan and Wet'suwet'en traditional medicines initially undertaken in collaboration with the Gitksan-Wet'suwet'en Tribal Council and with Beverley Anderson in 1985. In 1987-1988, I worked as project ethnobotanist with the Traditional Medicine Project. I have sought to extend the work begun in the mid 1980's with continued interviews with elders, collection of vouchers and documentation of plant specimens, and a review of the relevant pharmacological and ethnobotanical literatures. I have broadened the initial area of inquiry to include foods, technology, and land relations.

Methods

The data were gathered over a period of eleven years in a series of unstructured interviews with elders and other knowledgeable people regarding healing, medicinal uses of plants and other plant uses, identification and naming of plants, landscape classification, and several field trips to gather medicinal plants and plant foods. In 1996, a short series of more directed interviews on the topic of plant classification was undertaken. From 1985 to 1988, and sporadically in 1992-1995, some interviews were conducted with the assistance of Beverley Anderson, who is a Gitksan public health nurse; she also conducted interviews on her own and contributed a great deal of information to the project. Interviews were conducted in English, or in Gitksan with a bilingual translator, with use of Gitksan plant names and other botanical terms. Information on plant uses, ethnoecology, traditional life, or traditional healing was gathered from 60 people in more or less formal contexts. Thirty-one consultants were women, and twenty-nine were men. The majority (49) were over 50 at the time of interviewing.

Plant information was often elicited by bringing fresh specimens to elders and inquiring what specific plants were called. Information was also collected by reference to a looseleaf notebook of colour photos of local plants and plant parts such as berries, stems, petioles or rootstocks. Other plant data was volunteered spontaneously. Confirmation of identity of spontaneously described plants was by reference to fresh plant material collected to confirm postulated identifications, and to "case" specimens (Bye 1986) of known identity (e.g. a dried plant rhizome carried as a charm) or by freehand sketches and verbal descriptions, later verified by showing a plant or specimen to an elder to confirm the identification. However, some Gitksan plant information may have been missed as no systematic program of elicitation of names and use information of all local plants was undertaken. Some terms and/or descriptions and uses were heard for which no botanical species could be identified.

Ethnomedical data were gathered in the course of interviews on the topic of plant uses, and in several interviews specifically on the topics of shamanic practice and traditional healing. Perspectives on health and healing were also shared in the course of informal conversation. Ecological data was specifically targeted in 1995 fieldwork and to a lesser extent in 1996.

I identified vascular plant specimens by reference to Hultén (1968), and Hitchcock and Cronquist (1973), supplemented by various publications by the Royal British Columbia Museum, and other more recent field guides. Difficult specimens have been identified with the assistance of the Botany

Division of the Royal British Columbia Museum. Bryophytes and fungi have been identified with the assistance of the staff of the Cryptogamic Herbarium in the Biological Sciences Department of the University of Alberta. Plant specimens have been deposited in the Herbarium of the Botany Division of the Royal British Columbia Museum, and in the Vascular Plant and Cryptogamic Herbaria of the University of Alberta. A set of medicinal plant vouchers is also maintained at the library of the Office of Hereditary Chiefs in Hazelton, British Columbia.

Photographs of plants, artifacts, gathering activities, Gitksan elders, a First Salmon Ceremony and two totem pole raisings, were also taken over the course of the research. As mentioned above, many of the interviews were taped. Copies of all tapes and notes made during this project are on deposit in the library of the Office of Hereditary Chiefs in Hazelton, British Columbia, and tapes, transcripts, and photographs from the 1996 interviews are on file at the Archives of the University of Washington.

In keeping with the collaborative nature of this study, copies of all publications arising out of this research to date are housed in the library of the Office of Hereditary Chiefs as well.

Methodological Considerations

Rosaldo (1980), in a thought provoking paper on oral history research, discusses the use of multiple lines of evidence to cross-check and refine the picture of past events. This approach is also applicable to dealing with accuracy of information between consultants discussing topics as diverse as healing properties of herbs, cosmological interpretations, or functions of the territory system. Johns *et al.* (1990) developed criteria of informant consensus in a study of healing practices by Luo healers in Kenya. Reports of plant uses not replicated by other healers were not considered in the study.

In general I also have sought confirmation of plant uses by as many consultants as possible. However, some knowledge is idiosyncratic or familial. Especially among Northern Athapaskans, practices may be personal, obtained in visions or dreams and regarded as spiritually revealed knowledge not to be shared (Goulet 1994, Guédon 1994). I have also encountered examples of familial knowledge among the Gitksan and Wet'suwet'en (cf Art Matthews Jr., Dinim Get, personal communication

1994). People fear negative consequences from unsuccessful outcomes of non-family members using their recipes. Gardner (1976) and Christian and Gardner (1977) provide important discussions of the non-uniform distribution of knowledge in a culture. David Young (personal communication 1994) discusses the distinctions between specialist and general or folk healing knowledge. This study generally reports only widely shared and generalized plant uses.

I addressed the problem of data accuracy by speaking to a wide cross-section of consultants and cross-checking information about similar types of ceremonies or herbal preparations, as well as recording what the same consultants said about the same plants or practices on different occasions. Some consultants recall things which other consultants may not know about or recall; these single reports are additive in producing a more complete picture of past practices. Care is required to distinguish such information from idiosyncratic reports which may never have represented more general practice.[1]

Theoretical Approaches

The Biobehavioural or Biocultural Perspective

In order to deal with plant medicines in an ethnomedical context, it is necessary to understand the local views of medicine and healing. Only within the context of the culture can the logic behind treatment modalities and employment of different plant medications be understood. However, one can go beyond the purely emic view. It is my assumption that healers have refined their healing practices through empirical observation and testing throughout human history. Assuming that plants are chosen for empirical properties as well as symbolic aspects leads to the hypothesis that the plants chosen for treating different illnesses are likely to have chemical or physical properties comprehensible by western science which make them logical choices for healing certain conditions, given pan-human physiology and the indigenous concepts of approach disease causation. Nina Etkin (1986), Carol Browner (1985; Browner *et al.* 1988) and Bernard Ortiz de Montellano (1986); Ortiz de Montellano and Browner (1985) have demonstrated the utility of this approach. As Etkin has said "...one important contribution of a biobehavioral perspective in ethnopharmacology is to point the way of evaluating the efficacy of plant utilization in view of specific sociocultural contexts within which such behaviors occur." (Etkin 1988:26)

Etkin and Ross (1991) argue cogently for consideration of total plant ingestion when studying ethnopharmacology and the relationship of plant consumption to disease process. They note that consumption of pharmacologically active foods may affect disease susceptibility or progress (Etkin and Ross 1983; Etkin 1986, 1988; Keith and Armelagos 1983) and may represent a larger or more prolonged exposure to pharmacologically active compounds than plant uses specifically labelled medicinal. Teas are also frequently a source of both nutrients and medicinal compounds (cf. Young and Olson 1992). Cosmetics and lotions may also be pharmacologically active.

Johns (1990) advances the interesting hypothesis that food and medicine are intimately related evolutionarily; he suggests that ancestral primates consumed a wide variety of plants containing secondary compounds which, though toxic in high doses of any single compound, in low doses acted to reduce parasites and fight infection. As humans began to detoxify (see Stahl 1984 and 1989) and then to select foods for low toxin content through plant domestication, they concurrently began to select plants with high secondary metabolite content for medicines, and perhaps for spices as well (Figure 1-2).

Nutrition is, of course, an important aspect of health and illness in its own right, apart from pharmacologically active compounds. Interrelations of nutrition and health are reviewed by Pelto and Pelto (1983). Nutritionally related health problems which affect modern indigenous peoples, including Native Americans and Canadian Native people, are obesity, diabetes, and gall-bladder problems. West (1974) called attention to the epidemic of diabetes in North American and Polynesian native peoples. Neel (1962, 1982) proposed the "thrifty gene" hypothesis, explaining high susceptibility to diabetes on high sugar, fat and refined carbohydrate diets as the results of prior genetic selection for high insulin response to food intake in a low carbohydrate diet to allow for fat storage to withstand subsequent famine, and to support successful pregnancy and lactation. Weiss et al (1984) have argued for the existence of a "New World Syndrome", which includes obesity, diabetes, gallstones, gallbladder cancer and abnormalities of cholesterol metabolism. Weiss feels that the "thrifty gene" must involve alterations of lipid metabolism. Szathmary (e.g. 1986, 1989) has investigated diabetes among the Dogrib in the Northwest Territories, and comments that the diet and living conditions of such northern Native people represent a "filter" through which all migrants to the Americas would have passed in crossing Beringia. Ritenbaugh and Goodby (1989) discuss the relevance of environment and diet at far northern latitudes to human physiology and the risks presented by altered diets and activity levels of modern Native people. This type of analysis is certainly applicable to the Gitksan and other Northwest Coast peoples, where obesity and diabetes are prevalent Native health problems, and alterations of diet and activity in recent decades has been profound.

Food can also be considered as medicine (Pelto and Pelto 1983; Anderson 1990). For example, certain illnesses are traditionally treated in Chinese medicine by consumption of certain foods such as cabbage, chinese cabbage, mustard greens and the like; it turns out that these brassicas are high in vitamin A, which is deficient in many of the staple foods of the traditional diet of the Chinese poor (Anderson 1990). Food is certainly most effective as medicine when the health problem is a deficiency disease (cf the discussion of scurvy as a disease of European seafarers and its cure in Pelto and Pelto 1983). Native people express a holistic perception of health which includes diet (Interview Notes 1988; Nabhan 1991). Elders have told me that consuming wild meat, and particularly the broth from it, is good for health. Such broths and the broth from boiled fish heads may be considered part of the proper treatment of the ill (cf. the stereotyped 'Jewish penicillin', chicken soup).

Wein *et al.* (1989, 1993) investigated food related health beliefs of Northern Alberta Native people. People both preferred and thought 'bush' foods were healthy. Food beliefs also have a moral character; correct treatment of food species, appropriate consumption, and the distinction of species considered acceptable or not acceptable for food are all aspects of food-related beliefs and behaviour with a moral component. Transgression of these guidelines may be expected to have health consequences in the emic view.

As Young and Olsen (1992) have pointed out, there are also nutrients found in medicinal teas, and where tonic preparations are frequently taken, these can be significant in the diet. The classic examples are the intake of vitamin C in conifer needle and Labrador Tea infusions.

Romanucci-Ross *et al.* discuss the dual nature of medical anthropology in the preface to their text on medical anthropology:

> For a century in the West, there have been two literatures regarding the health sciences. They have represented two different canons, or paradigms: the approaches of biomedical science and of behavioural science. To simplify somewhat, the biomedical paradigm tells us that, for example, tuberculosis is "caused" by *Mycobacterium tuberculosis*, whereas the behavioral science paradigm tells us that tuberculosis is "caused" by poverty and malnutrition. It is our contention that these two approaches can be integrated into one biohuman paradigm; further, we contend that the unifying factor is the concept of culture. By culture we mean the system of meaning–belief, knowledge, and action–by which people organize their lives....
>
> Human beings are simultaneously cultural and biological creatures, and these two dimensions necessarily interact. The historical concern of...anthropologists with these two factors...means that the study of human health and healing, where people *attempt to influence directly the relationship between biology and culture* is one rich with potential for learning fundamental things about what it means to be a human being.
>
> Perhaps the greatest difference between these two paradigms and the greatest obstacle to their resolution lies in the notion of efficacy.(Romanucci-Ross *et al* 1983:viii-ix)

A third perspective, of course, is the ethnomedical which recognizes the possibility of factors in health and disease not explicitly contained in either Western biomedicine or behavioural science.

Medical Anthropology/Ethnomedicine

The treatment of medical practices of non-western groups has varied greatly among medical anthropologists, ethnobotanists, botanists, and ethnopharmacologists. Ethnographic and medical anthropology studies have often emphasized the specific socio/cultural aspects of illness, focussing on symbolism and social integration, or on meaning (*e.g.* Barbeau 1958; Hallowell 1963; Jenness 1943; Ritzenthaler 1953; Glick 1967; Good 1977; Nurge 1958; Lévi-Strauss 1963a,b; Rubel and Hass 1990).

Ethnobotanical studies have tended to focus on plants as medicines for biologically based ailments (*e.g.* Black 1980, Chandler *et al.* 1979, Densmore 1928, Leighton 1985, Train *et al.* 1941). Implicit in many studies is the European-derived concept of drugs as specific remedies for specific conditions, which contrasts sharply with the viewpoint of many ethnomedical systems including Ayurvedic (Trawick 1991) and Chinese (Hart-Brent Collins, personal communication 1986). (Indeed, early ethnobotanists often dismissed treatments not based on evident biological causes in accord with Western biomedical notions as "superstition", *e.g.* Chamberlain 1964). Botanists and pharmacologists also usually view plants (described in western scientific nomenclature) as medicines for specific diseases (often western medical categories); studies frequently focus on active chemical compounds of traditional cures, ignoring symbolism, indigenous concepts, and the curing context (e.g. Vlietnik and Vanden Burghe 1991; Cordell, *et al.* 1991; Joshi and Eddington 1990). Both of these approaches are incomplete and have serious shortcomings (cf. Moerman 1983). As discussed in the previous section on Biobehavioural Perspectives, I have chosen to follow an analytical pathway which incorporates both biological and cultural, etic and emic information.

I believe comprehension of ethnomedical practices must incorporate a biological perspective which includes human anatomy and physiology, an awareness of the chemical components and properties of curative plants, and local ecology. It must also encompass cultural context, including indigenous concepts of disease and its etiology, the properties and nature of curative plants, and indigenous treatment modalities. Without an understanding of cultural context, ethnobotanical reports are mere lists of plants and uses, organized and structured according to Western scientific taxonomy and medical or use categories. These become exotica or curiosities, at best useful as a sort of raw material for the scientific investigation of the potential of listed plants as sources of foods or medicines. Likewise, the mere reporting of curious and exotic ethnomedical practices gives little indication of how, why, or whether, these work to promote or restore health (cf. Anderson 1991), although authors may provide very interesting symbolic or functional analyses of the practices.

Medical anthropologists have elaborated theoretical and methodological approaches which attempt to bridge and mutually inform the biological and cultural approaches to the study of human health and healing. Recent studies and collections have appeared espousing 'biobehavioral', 'biocultural', or 'biohuman' perspectives on medical anthropology (Etkin 1986, 1988; Etkin and Ross 1991; Browner 1985; Browner *et al.* 1988; and Ortiz de Montellano 1986; Ortiz de Montellano and Browner 1985; Armelagos *et al.* 1992; Dettwyler 1992; Carey 1990). A dual approach incorporating western and non-western perspectives is appearing in transcultural psychiatry (Guarnaccia 1993); while still one step removed from a biocultural perspective, it is a necessary intermediate phase.

Authors such as McElroy (1990), McElroy and Townsend (1989), Townsend and McElroy (1992), and Johnson and Sargent (1990) have also integrated an ecological dimension into the dual biological and cultural approach to understanding of disease and healing in cross-cultural contexts. Some authors, especially of the 'critical' medical anthropology school (e.g. Singer 1989), have criticized the ecological approach, contending that social and economic forces often are more the "cause" of the ill health of populations such as the rural or urban poor, than ecological conditions. This calls to mind the debate cited above by Romanucci Ross *et al* (1983) regarding the causes of tuberculosis. While their criticisms are legitimate, this does not invalidate the ecological approach; rather, it points out the intricacies of the cultural, social, economic, biological and ecological causes of human illness and health, and the necessity to frame the study of medical anthropology in a number of diverse ways. Indeed, one recent author does incorporate both critical and ecological perspectives in a paper on health issues and responses of Andean peasants (Carey 1990).

It is obvious that the biochemistry and pharmacology of plants employed as medicines are likely to affect the human organism and may effect healing. It is less obvious that some aspects of ceremony and non-biochemical aspects of healing may also affect the body and its physiology, allowing analysis of the etic efficacy of certain aspects of traditional medicine. Jilek (1982a,1982b) has analysed various aspects of the Salish winter ceremonials in terms of their physiological effects. An entire issue of *Ethos* (10(4) 1982) was devoted to shamanism and endorphins. More recently, some of the intricate feedbacks between mental states and physical states is coming to be understood. It now appears that, for example, depression (clearly a mental state) may (physiologically, biochemically) lower immune function, and may therefore predispose the depressed patient to organic illness (Hafen *et al.* 1996). Therefore, a treatment which was psychologically (or spiritually) effective in counteracting a state which Western psychiatrists would diagnose as depression might be expected also to cure or prevent illness caused by bacteria, fungi or viruses–or to be effective against mysterious and difficult conditions like cancer.

Although the reasoning behind various treatments may differ sharply from what a Western biomedical practitioner may understand, the effects may be comprehensible from a Western scientific perspective. The thought provoking article by Johannes (1986) on the curative pharmacological properties of meals consumed during treatment of illness by New Guinea Highlanders is a case in point. Likewise, the discussion of Guajiro illness concepts and therapies by Perrin (1986) mentions that for serious diseases, thought to be caused by soul loss or spirit contamination, the shamanic seance is considered by the Guajiros to be of primary importance in addressing the cause of the illness. However, the shamans also deliver herbal treatments to their patients which in large part consist of plants considered efficacious against the physical symptoms of the illness. While this is considered secondary in Guajiro conceptualization, the pharmacological efficacy of the plant compounds administered may be a major component in the physiological effects of the treatment. The stimulation of the immune system and release of endorphins by the ceremonial aspect of the treatment might be involved in the effects of the treatment as well. Perrin himself refers to the social and cultural side of medical anthropology by commenting that shamanic treatment also addresses the issue of community integration and resolution of tensions in the social net.

Oral History/Memory Ethnography

> ...life-history investigation provides a model for research. Instead of working from the conventional formula in which an outside investigator initiates and controls the research, this model depends on ongoing collaboration between the interviewer and interviewee. Such a model begins by taking seriously what

> people say about their lives rather than treating their words simply as an illustration of some other process (Cruikshank 1990a:1; emphasis added).

A theoretical issue which must be dealt with in the interpretation of the data I have gathered is the nature of oral history. In my research, which is in part "salvage" ethnography attempting to rescue endangered cultural knowledge[2] residing presently largely in the minds of elders, the question of how people present and represent remembered events, and what relationships their memories have to events and practices as they occurred cannot be ignored. I attempt to synthesize and reconstruct practices and beliefs which have undergone a great deal of change over the memories of living elders; insofar as I am further tapping what they learned from their grandparents and great-grandparents when they were young, even more profound changes have taken place since the reported events or practices occurred.

Subsistence activities and herbal remedies do not seem to provide much arena for divergent interpretations of 'truth' which require careful translation, or reconstruction of 'historical' types of truth. However, the drive for self determination and validation of Native heritage after decades of concerted efforts by the Church and governmental authorities for assimilation do affect Native people's picture of life in the past before the imposition of schooling and settlement into reserves. A certain amount of idealization and romanticism colour the perception of 'traditional' life on the part of younger Native people seeking to define their own identities and searching for self-esteem in an Indian context. Social structure, shamanism, cosmology and land relations are perhaps more subject to interpretation and reinterpretation than herbal recipes and trapping techniques in light of the present political and social reality of the Gitksan people, which includes the drive for self-determination, the land claims court case, and the recently stalled treaty negotiations with the province of British Columbia.[3]

The Gitksan people have made a conscious effort to synthesize and systematize (or perhaps construct and reconstruct) a true Gitksan way of government and life. This is especially evident in the renaissance of the feast system, and in the reassimilation of many people into the traditional clan system through the passing on of Indian names, many of which have been unused for decades, to incorporate people returning to the system.

Houses (**Wilp**) now hold formal meetings to address concerns including health transfer and forestry, as well as to discuss who should inherit recently vacated titles, and how and when to set up the necessary feasts to conduct the required business. In this atmosphere, traditional knowledge acquires new meanings and appears in new contexts. Cruikshank (1990 a,b) alludes to similar transformations and the continuing evolution of 'traditional knowledge' in oral narrative.

Interpretation and Analysis: Epistemology and Hermeneutics

How one acquires knowledge is by no means universal in human cultures. Whether one accepts as true that which is traditional and taught by respected authorities, what one reads in printed texts, what one sees on the television, what one directly and personally experiences, what one is taught by divine or spiritual beings, or what one carefully observes according to the tenets of occidental empiricism, is partly a matter of what models of verification of truth one has encountered. Goulet (1994) comments that for the Dene Tha, what is truly known includes only what is directly experienced (which includes dreams and visions), not what one has heard from others ('they say...') or, significantly, what one is told by teachers or reads in books. Guédon (1994) comments on the role of the experiential in knowing for the Nabesna, another northern Athapaskan people. What is told or verbalized is less significant than what is learned spatially on the land and through one's body. Christian and Gardner (1977) too comment on the individualism of knowledge for northern Dene people. Sharp (1987), also writing about a northern Dene community perceptively comments on how individual theories of causation of a series of events can be linked by a constructed umbrella of causation by 'supernatural' beings such as giant otters.

A Western academic background biases one toward other models of truth. Scholars in the Western tradition value that which is written according to prescribed rules, and in general share an empiricist model of truth, especially when dealing with themes which can be described as 'scientific'. Western culture is materialist and reductionist for the most part. Dreams, although conceded to provide inspiration to poets, and perhaps to provide information about psychological problems to psychoanalysts, are not considered to be real or true experiences.

Sources of knowledge among the Gitksan differ somewhat from the Eurocanadian models. Intuition, dreams, observation, reasoning, tradition, or teaching of remedies and preparation within family lines all figure in the generation and diversification of healing knowledge. In the past in shamanic practice, insights from spirit helpers and instruction on how to proceed guided healers' choices in the course of treatment and were the source of healing songs and diagnoses (cf. Isaac Tens narrative, Barbeau 1958).

Confrontation of disparate world views involves concepts of causation, relationship, and the nature of being. Different rationalities and theories of how the world works may be involved. Translation is necessary to attempt to foster understanding or any comparison. Julie Cruikshank (1990b) talks about this as part of the process of doing oral history work with Yukon Native elders. This type of cultural translation is also part of the process of doing ethnobotanical and ethnomedical work; it is necessary to the exploration of Gitksan conceptions of themselves, their relationship to land, health and illness, and the nature of healing plants. David Young (Young and Goulet 1994) refers to this translation process as hermeneutics.

Tambiah (1990) gives an extended discussion of translation in *Magic, Science, Religion and the Scope of Rationality*. "The translation of cultures overlaps with the question of comparability and *commensurability* between 'their' phenomena, concepts and categories and 'ours'." (Tambiah 1990:111)

Regarding translation of concepts from a different culture into one's own, Tambiah writes:

> ...there is a world of difference between establishing a *one-to-one correspondence* between a concept or practice in another culture and one in our own, and *mapping* a phenomenon in another culture onto one of our own. The latter involves establishing by a dialectical process the overlaps as well as the differences in their contours and their provenance, thereby raising the question of meaningful "comparison" and "commensuration" (Tambiah 1990:123).

Elois Ann Berlin (Berlin and Berlin 1996) has discussed these issues in medical anthropology with reference to her work on Maya ethnomedicine and gastrointestinal diseases. Similar issues also arise in the attempt to understand culturally defined conditions like *susto* ('fright'). Non Latino scholars had surmised that *susto* might be a cultural manifestation of clinical depression, but work summarized in Browner *et al.* (1988) calls this correspondence into question.

In my exploration of Gitksan ethnobotany and traditional medicine, I have sought an integrated picture of the world which encompasses both an empirical and scientific view, and acknowledges the other types of truth found in our own culture and in Gitksan culture. I am not certain to what degree such an integration is achievable, given the diverse nature of truth and of models of truth, and the relatively limited understanding possible to a human being.

My fundamental philosophical bias is empiricist: I consider empirical truths relating to causality and things "out there" to be valid, and indeed to be the basis of most of my own understanding of the world, but I consider this structure incomplete. The truths of art, myth, dance, ritual, and spiritual experience have their places too. Aspects of these world views or approaches to truth appear incommensurable with the empiricism of science. Yet, these levels or types of truth impinge on one another, exchange ideas and awareness, inform each other.[4]

Ethnobiological Classification

As part of my study of Gitksan plant knowledge, I have explored Gitksan classification and naming of plants. Learning traditional Gitksan plant uses was impossible without elicitation of names and understanding their referents, as most Gitksan have limited plant vocabulary in English. After some time, I began to reflect on the correspondence of Gitksan understandings with those of scientific botanists, and with folk classification of other groups.

Recently there has been a debate among ethnobiologists as to the basic nature of ethnobiological classifications. Some theorists, notably Atran (1990, 1985), Berlin (1992), and others such as Taylor (1990) see ethnobiological classification as a unified system, based in morphology and perceptual features (primarily visual), and featuring a hierarchical structure characterized by relations of class inclusion. Others such as Ellen (1986, 1993), Hunn (1982) and Randall (1976, 1987; Randall and Hunn 1984), Morris (1984), and Turner (1987, 1989) have suggested that ethnobiological classification incorporates not only morphological and perceptual features, but also symbolic and utilitarian characters, and may be organized by a wider variety of relationships than strictly taxonomic structures.[5] Wierzbicka (1985) favours the organization of ethnobiological classifications into true taxonomies, with no empty contrast sets, but incorporates utilitarian features in the definition of classes.

Ethnobiological and ethnozoological classifications do not always form unified systems organized by taxonomic hierarchy. The degree of hierarchy, unification of the classification system and incorporation of non-morphological characters of the included classes appear to vary between cultures. Some of this variation may be due to geographic area and to subsistence type, while some is probably idiosyncratic. Classic taxonomic relationships distinguish various folk systems and various portions of other folk systems but there are a variety of approaches "pieced together" in many classification systems, including pairing, coordination (Hunn and French 1984) and encompassment (Forth 1996) in addition to transitive class inclusion. Perceptual morphological classification and "utilitarian" or "symbolic" classification can both be found in classification systems of different cultures (cf. Bulmer 1974:13,23). Daniel Clément (1995) elucidates the utilitarian underpinnings in general purpose ethnobotanical classification with his sensitive and thorough analysis of Montagnais and Algonquin ethnobotany, providing some linkage between the divergent "utilitarian" and "general purpose taxonomic" viewpoints.

Authors like Ellen (1993) emphasize the need to place ethnobiological classifying behaviour in context and stress the variation of knowledge between consultants and in different situations. Ellen and Taylor (1991) prefer to observe classifying behaviour in a variety of contexts through protracted participant observation, finding that formal eliciting frames may distort the data. I also prefer to work in a more open ended approach, and I do not use formal elicitation techniques of the type favoured by Berlin (1992) and co-authors (Berlin *et al.* 1973).

Ethnobotanical and Ethnomedical Studies of Northwest Coast Peoples

Previous research on the Northwest Coast and its peoples has been extensive. The rich ceremonial life, oral texts, material culture and art of the northwest coast cultures has been described and documented by many observers since the latter half of the nineteenth century (e.g. Boas 1916, 1935, 1966; Garfield 1937, 1951; Swanton 1905; Emmons 1992). Documentation of traditional uses of plants and the role of plant materials in the lives of Northern and Northwest Coast peoples has lagged behind other aspects of ethnography. The common view of Northwest Coast peoples as hunters or as fishing cultures may obscure the contributions of plants to their economies (Hunn 1981). Specifically ethnobotanical studies have been undertaken in the past twenty years, mostly in the central and southern part of the province by Nancy Turner and her associates (Turner 1973, 1987; Turner and Bell 1971, 1973; Turner and Efrat 1982; Turner *et al.* 1981; Turner *et al.* 1983, Turner *et al.* 1990).

Harriet Kuhnlein and collaborators carried out a long term project on the nutrient values of traditional Nuxalk foods (Bella Coola), many of which are also important in the diets of the Gitksan and other more northern groups (Kuhnlein 1984, 1989, 1990; Kuhnlein *et al.* 1982a). In addition, McNeary's doctoral thesis (1976) deals with land relations of the Nisga'a and contains some preliminary ethnobotanical and ethnozoological data and discussion.

Several recent scholarly papers on northern B.C. dealing with ethnobotany have been published, some from my own ongoing research. These present traditional medicine and healing herbs of the Gitksan (Gottesfeld and Anderson 1988), bark uses of the Gitksan, Wet'suwet'en and Haisla (Gottesfeld 1992a), medicinal use of a fungus by the Gitksan and Wet'suwet'en (Gottesfeld 1992b), aboriginal burning (Gottesfeld 1994a), Wet'suwet'en ethnobotany (Gottesfeld 1994b), nutritional role of Wet'suwet'en plant foods (Gottesfeld 1995), Haisla ethnomycology (Compton 1995), Wakashan ethnotaxonomy (Compton n.d.a), the identification of 'wild carrot' (Compton 1993a), Carrier traditional medicinal plants (Ritch-Krc *et al.* 1996a) and the antimicrobial and anticancer activities of some Carrier medicinal plants (Ritch-Krc *et al.* 1996b). Compton's dissertation (1993b) is a comprehensive compilation of Heiltsuq, Henaksiala and Southern Tsimshian ethnobotanical knowledge, with a botanical and linguistic emphasis. My master's thesis documented Wet'suwet'en ethnobotany and land relations (Gottesfeld 1993). In addition, recent unpublished studies have explored Chilcotin ethnobotany (Turner *et al.* 1990) and Carrier traditional medicine (Ritch-Krc n.d.), and literature reviews have examined botanical and zoological terms in Tsimshianic languages (Compton n.d.b; Compton and Tarpent 1994).

Some initial work in Gitksan, Carrier and Bella Coola ethnobotany was undertaken by Harlan I. Smith in the 1920's. His 1928 paper made brief mention of medicinal plant uses of the Gitksan; however Smith (1928) contains botanical errors, and his botanical attributions and Gitksan names should be corroborated by research with modern consultants where possible. Smith also produced two draft manuscripts, one on Gitksan ethnobotany about 1926,[6] and one on Carrier ethnobotany in 1923-4. These manuscripts are on file in the Canadian National Archives, as are other ethnobotanical notes from that time period. Verification or correction of information which Smith collected 68 years ago has been a focus of my recent work on Gitksan ethnobotany, and information from his unpublished manuscript has been integrated with my own and other recent data on Gitksan plant uses in the treatment that follows.

Scattered references to plants and their uses by the Gitksan and other indigenous groups of northwestern British Columbia are contained in various ethnographies (e.g. Boas 1916; Barbeau 1958; Cove and MacDonald 1987; Lopatin 1945; Jenness 1943, 1937; Emmons 1911), unpublished field notes (Barbeau, Jenness), and locally produced publications (Jensen and Powell 1979; Gottesfeld 1991; Wilson *et al.* n.d.; Campbell *et al.* 1984; People of Ksan 1980; Naziel and Naziel 1978; Carrier Linguistic Committee 1973). As with the material amassed by Smith, these materials require careful examination, interpretation and further research to document the correct identity of the plants mentioned, and where possible, confirm the plant uses or stories reported.

In addition, shamanism and healing practices have been described in various contexts for various indigenous groups in British Columbia, some of which are directly relevant to, or indeed, document, Gitksan shamanism. Unfortunately, these descriptions are not linked to ethnobotanical, ethnomedical or epidemiological data. Barbeau's Medicine-Men on the North Pacific Coast (1958) contains a detailed and rich narrative by Isaac Tens of Hazelton about the experiences which led to his becoming a shaman (**halayt**), and the nature of his **halayt** practice in the early years of this century. Jenness (1943) discusses Wet'suwet'en and Carrier spiritual and shamanic beliefs, and describes a **kalutlem** secret society healing ritual which he was invited to attend. Several oral histories also allude to shamanic visions and activities (Cove and MacDonald 1987, Jenness 1934). Modern papers dealing with Gitksan and Coast Tsimshian shamanism include Guédon (1974, 1984a,b) and Miller (1984). De Laguna (1972) and Emmons (1992) describe Tlingit shamanism in detail; Jonaitis (1986) also contains valuable insights into Tlingit shamanism and symbolism. Haisla shamanism is discussed in Olson (1940) and in Lopatin (1945). Further south, Boas (1935 and 1966) describes Kwakiutl shamanism; Drucker (1951) gives a detailed discussion of Nootka shamanism and healing, and Jenness (1955) and Kew and Kew (1981) describe Salish shamanism. Jilek discusses modern Salish winter ceremonials (1982a,b) from the perspective of ethnopsychiatry.

Guédon's studies remain the only modern publications to describe recent Gitksan shamanism and related approaches to knowledge and healing. Mills (1988, 1994 a,b; Mills and Slobodin 1994) provides some detailed and absorbing analyses of reincarnation beliefs, central in Gitksan cosmological understandings. Halpern (1984), Robinson (1962), and Harris, himself a Gitksan chief, (1974) also aid in understanding Gitksan cosmology, and my own exposition of conservation ideology among the Gitksan and Wet'suwet'en touches upon cosmology and the place of humans in the world (Gottesfeld 1994c).

Conclusions

Although a great deal has been written about various aspects of Northwest Coast art, history, modern politics and ethnography, this is one of the first modern studies to deal with ecology, ethnobotany, and healing knowledge on the northern coast. I have attempted to frame an inquiry into the use of plants for medicines and foods in the broader context of Gitksan notions of wellness, illness, and the place of humans in the world. This led me into ethnoecological knowledge, understandings of plants, and explorations of basic concepts of the world necessary to understanding Gitksan conceptions of wellness and illness. I have also examined Gitksan plant use from the perspective of ecology and phytochemistry, examining the insights of pharmacognosy, biomedicine and nutrition, in an attempt to understand what factors may influence people's choices of plants to use for foods and medicines. For this purpose I have attempted to examine indications of "empirical efficacy" of traditional medicinal plant uses. It is not my purpose in this dissertation to establish the efficacy of Gitksan traditional healing as a whole, but rather to investigate the potential contribution to health which may be made by traditional medicinal plant use, and by traditional plant foods. I will assume for purposes of this analysis that presence of active phytochemicals or positive bioassay results can be taken as indications of potential physiological efficacy of plant preparations in actual healing contexts. This is, of course, a perspective which views the human system in chemical or physiological terms. There is, as discussed above, far more to healing than chemistry; healing occurs in whole human beings and in social context. Many factors beyond the chemical level enter into a healing situation. Spiritual factors and movements of "energy", for example, cannot be addressed with a biobehavioural approach. Some potential insights into the nature and efficacy of Gitksan healing cannot therefore be gained through a biobehavioural analysis.

I have endeavoured to show my respect for the Gitksan people with whom I work in this written synthesis of their healing and plant knowledge. It is my hope that this work will be useful for them as well as being of interest in anthropology and ethnobotany, and may provide at least a means of communication between cultural perspectives as I explore Gitksan uses of plants and understandings of health.

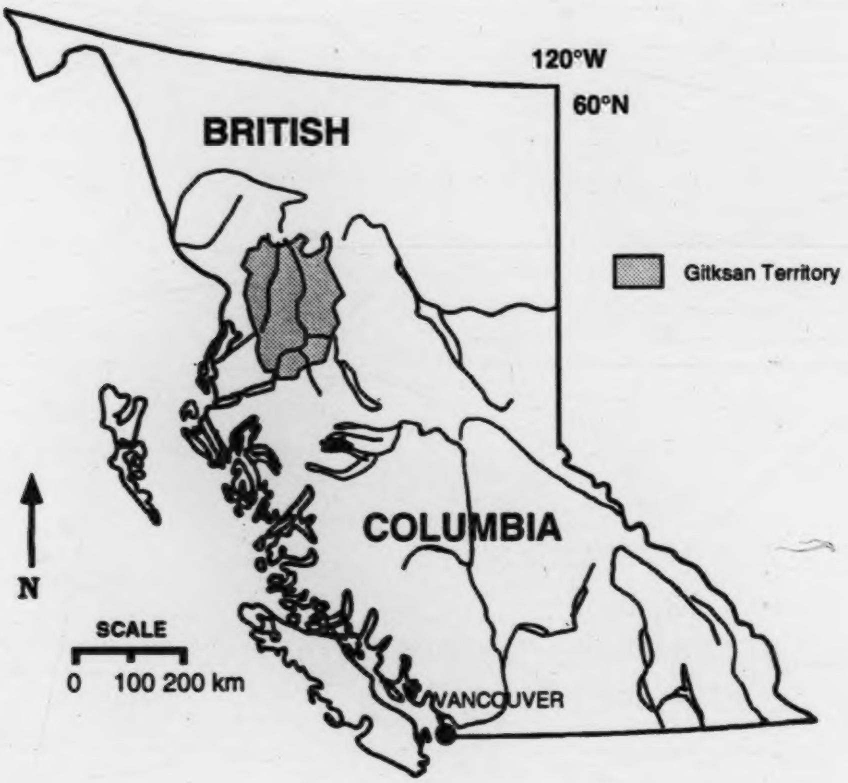
120°W
60°N
BRITISH
COLUMBIA
Gitksan Territory
N
SCALE
0 100 200 km
VANCOUVER

Figure 1-1 Map of Gitksan Territory
The territory depicted here includes the territories of all of the Gitksan villages and does not represent the area of the Gitksan Land Claim.

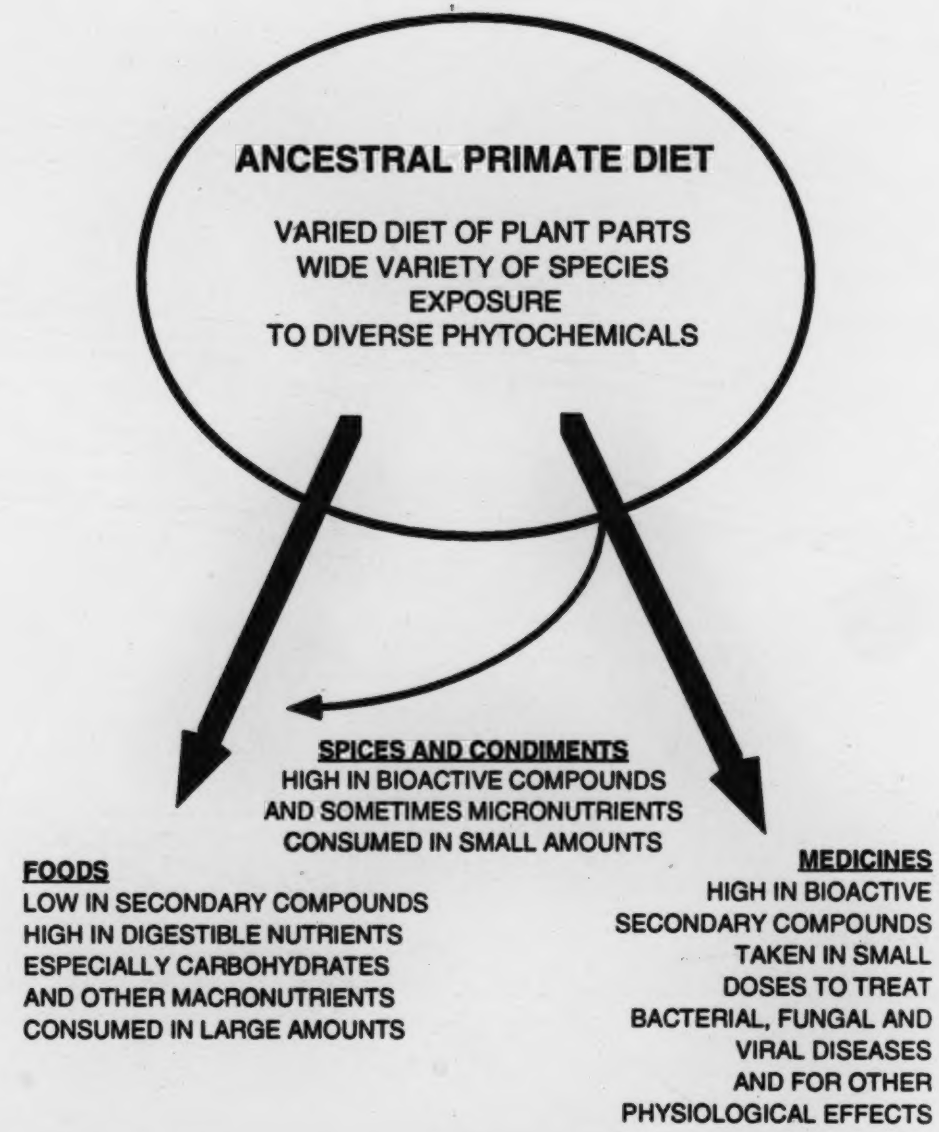
ANCESTRAL PRIMATE DIET
VARIED DIET OF PLANT PARTS
WIDE VARIETY OF SPECIES
EXPOSURE
TO DIVERSE PHYTOCHEMICALS
SPICES AND CONDIMENTS
HIGH IN BIOACTIVE COMPOUNDS
AND SOMETIMES MICRONUTRIENTS
CONSUMED IN SMALL AMOUNTS
FOODS
LOW IN SECONDARY COMPOUNDS
HIGH IN DIGESTIBLE NUTRIENTS
ESPECIALLY CARBOHYDRATES
AND OTHER MACRONUTRIENTS
CONSUMED IN LARGE AMOUNTS
MEDICINES
HIGH IN BIOACTIVE
SECONDARY COMPOUNDS
TAKEN IN SMALL
DOSES TO TREAT
BACTERIAL, FUNGAL AND
VIRAL DISEASES
AND FOR OTHER
PHYSIOLOGICAL EFFECTS

Figure 1-2 Schematic chart of evolution of human diet, showing relationship of medicinal plant uses and spices to changes in food chemistry over time

Notes

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[1] One consultant mentions taking Indian hellebore internally, while all other Gitksan and Wet'suwet'en consultants state that it is never taken internally because it is highly poisonous. The consultant herself alluded to this, but commented that she knows that it is a good medicine. This I would class as an idiosyncratic report.

[2] Although some authors object to the framing of traditional knowledge as endangered, this is the perception of a number of Gitksan and Wet'suwet'en people, who desire that the knowledge of the elders be preserved so that it can serve modern Gitksan and Wet'suwet'en people.

[3] See McDonald (1990) for a discussion of the reconstitution of the pole raising potlatch by the neighbouring Tsimshian of Kitsumkalum in 1987 (an event I attended) as an example of the influence of the modern context on the reframing of traditional institutions.

[4] At times, consideration of one aspect of reality may pass from one type of perspective or truth to another. Tambiah (1990:131-137) discusses some of these with regard to cultural contact. He provides several examples, ranging from the supplanting of the cult of the smallpox goddess in Sri Lanka by the introduction of vaccinations and resultant local eradication of the disease, to the persistence of annual rituals of propitiation and offerings to tools by craftsmen in the Indian subcontinent even while the tools in question have shifted to those of modern factories and motorized vehicles, which the craftsmen in question well know how to maintain on a more pragmatic level.

[5] Forth (n.d.) however, in a careful analysis of the ethnozoological and symbolic referents of the Nage term **po**, argues that it polysemously represents both an ethnozoological category based on primarily visual and behavioural features, and a spiritual category, primarily conceived in auditory terms, which includes, in addition to owls and certain other types

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of birds, the **hebu** tree and various objects made from its wood, and the horns of sacrificed buffalo.

[6] Compton, Tarpent and Rigsby (in press) have recently edited Smith's manuscript, updating the botanical nomenclature and Gitksan orthography, and providing some ethnographic context. It will be published soon by the Canadian Museum of Civilization.

Chapter Two
Setting and Ethnographic Background

In this chapter I provide a background to the more detailed discussion of Gitksan healing and plant use which follows in later chapters. I first describe the physical and biological environment, then give summaries of Gitksan society and of the regional history. I finish by discussing the modern context of the study.

Physical and Biological Setting

The Skeena River is a large northern river, still without dams, which flows through the Skeena, Hazelton and Coast Mountains to reach tidewater just south of the port of Prince Rupert on the northern coast of British Columbia (Fig. 2-1). The lower reaches of the river have been the homeland of the Tsimshian for a long period of time, and the upper reaches the homeland of the Gitksan, people of the Skeena River.

The Skeena River supports runs of five species of anadromous salmon and steelhead trout, and the anadromous lamprey, as well as harboring populations of dolly varden and other trout species. The lower Skeena supports an oolachan[1] (*Thalicthys pacificus*) run, though not of the richness of the lower Nass or Kemano River runs.

Gitksan territory is mountainous, and heavily forested. Mountain tops and ridge lines are over 6000' in elevation, with deeply indented side valleys, along the central Skeena River. The entire landscape was heavily glaciated during the Pleistocene, with deglaciation completed about 9500 year BP (Gottesfeld 1985). Glacial deposits such as kame terraces still line the flanks of the broad and relatively flat-floored valley of the Skeena River itself, and of some of its larger tributaries such as the Kitwanga or Kitwancool River and the Kispiox River. The taller peaks all bear evidence of alpine glaciation during the Holocene,[2] and extensive alpine glaciers existed on the Seven Sisters (Wii Sk'anist and its neighbours), the Rocher de Boule (Stekyooden), Mt. Quinlan, Mt. Sir Robert, Knauss Peak, the northern Babines and the Coast Mountains; small remnant glaciers still exist on various mountains in the region, and the large Cambria Icefield and Frank Mackie Icesheets are still present in the Coast Mountains near Meziadin Lake. The Nass Basin to the north has more subdued topography, consisting of a fine mosaic of scoured low rocky ridges with intervening valleys, swamps and lakes, and the northernmost territories at the Skeena-Stikine divide are in a more arid and cold terrain with flat-topped mountains of Mesozoic Bowser and Skeena Group sediments (Gottesfeld 1985). The Skeena, Nass and Stikine Rivers all originate in this interior upland.

Climate in Gitksan territories is variable, depending on elevation and distance from the coast. Hazelton has about half the precipitation that Terrace does, and much less than Prince Rupert or Kitimat on the coast (Fig. 2-1). Sites closer to the coast are generally warmer in winter and moister, while interior sites are drier, with colder winter temperatures. Elevation also affects temperature, with higher sites having shorter growing seasons and cooler annual temperatures. However, cold air ponding in winter affects the valley bottoms along the larger valleys, giving them a more continental climate than the cloudy montane slopes above them. The Nass Basin to the north is higher in elevation than the valleys to the South, and has a cooler and moister climate. The northern territories have a strongly continental climate, with prolonged cold winters and relatively low precipitation. The northwestern territories are very cool and moist with high snowfall and glacier capped mountain massifs. Because of the highly mountainous nature of the Gitksan lands, micro- and mesoclimate variability is high; exposure and elevation, as well as factors like rainshadow effects, determine local environmental conditions.

Forest ecologists place Gitksan territory in the Coastal Western Hemlock Zone in the west, and the Interior Cedar Hemlock Zone in the east and to the North (Banner et al 1993). The eastern- and northern-most territories are in the Sub-boreal Spruce Biogeoclimatic Zone (Ministry of Forests and Lands 1988), although much of the northern landscape is in the subalpine or is grassy alpine tundra. Above the low elevation forest types are Mountain Hemlock Zone in the southwest, and Engelmann Spruce-Subalpine Fir Zones in the east , with Alpine Tundra above this on most mountains (Fig. 2-2; in map pocket). Avalanche activity creates zones of lush shrubby or herbaceous vegetation on the steep mountain slopes below timberline, which are important wildlife habitat for grizzly and black bears and moose.

The animals occurring in Gitksan territory are those typical of western and northern Canadian forested regions with alpine areas. The alpine is home to hoary marmots and mountain goats. In the last century mountain caribou were also widely distributed in the region[3] . The forest zones and valley bottoms support wolves, coyotes, foxes, black bears, grizzly bears, lynx, wolverine, marten, weasels, red squirrels, snowshoe hares, woodchucks, bushy-tailed woodrats, various species of mice, and shrews. Beaver, river otter, and mink are frequent in riparian zones and ponds and lakes. Reptiles and amphibians are few; the only snake is the gartersnake *Thamnophis sirtalis*. The most common amphibian is the ubiquitous toad, *Bufo boreas*. There are also several species of *Rana*, true frogs, and several types of salamanders and newts in the region, which are rarely seen. Birdlife is varied. Raptors include the conspicuous bald eagle, more rarely the golden eagle[4] , and various types of smaller hawks. Owls are present, especially the great horned owl. Migratory waterfowl and cranes travel through the region in spring and fall, and the many lakes and wetlands support nesting ducks and geese. Mergansers make their homes in the swift rivers. Many types of songbirds are present in the trees and thickets, especially in summer, when sparrows and warblers are present. The largest passerine bird is of course the raven, whose intelligence and varied calls attract human attention world wide. Both Steller's Jays and Grey Jays or Whisky Jacks are also common in the region and often frequent areas where people live or camp. Only a few of the smaller birds stay through the winter. Of these, the tiny and gregarious chickadee is the best known and most often seen. Pileated woodpeckers and other smaller woodpeckers are also conspicuous bird residents of the region. Game birds include several species of grouse and ptarmigan, which are found variously from valley bottom to alpine.

The People

The Gitksan believe that their ancestors have lived in the area where they now live since time immemorial. Modern syntheses incorporating geological perspectives suggest that the remote ancestors of the Gitksan have been in the area where they now live since deglaciation or shortly thereafter.[5]

Gitksan society is divided into four crest groupings (**Pdeek̲**) usually called Clans by modern Gitksan, and Phratries by anthropologists (cf. Barbeau 1929; Garfield 1951; Duff 1959). These are groupings of related people, though the actual genealogical relationships between members of one Clan are not known. There is Clan exogamy among the Gitksan. These crest groupings are correlative with crest groupings of other Northwest Coast peoples, allowing one to identify kin or potential marriage partners among the Haida, Haisla, Tsimshian, Nisg̲a'a or Wet'suwet'en, or among the Carrier in the Interior (Mills 1994; Seguin 1985).

Within the **Pdeek̲** are smaller groupings of people whose actual genetic relationship is known or surmised to be close, known as the House or **Wilp**. The **Wilp** consists of a group of related people, a lineage, with a high chief (**Sim'oog̲it**), whose name is the name of the House. Under the high chief are subchiefs, called "wings" **g̲aak̲**, and a series of ranked subordinate names (Harris n.d.). Among the Gitksan, as among other groups of the northern Northwest Coast, descent is reckoned matrilineally, and inheritance typically passes from a man to his sister's son. Women themselves can hold chiefly titles, although usually a male heir is sought. A Chieftainess is called **Sigidimnak̲**. In the past all of these people (except married women who usually lived with their husband's kin) and their spouses and dependent children would have been co-resident in one large house.

Each House belongs to a single village, though in modern times its members may actually live in a number of different places. Each House also has its distinct history, commemorated in **adaawak̲**, "true traditions", which are oral histories, and by owned crests (**ayukws**) and songs (**limx̲'oo'y**). The crests, which are icons of the oral histories, are displayed on chiefly regalia such as button blankets or dance blankets and headdresses (**amhalayt**), feast gear such as large carved serving dishes, and totem poles or other memorial carvings. In the past they were also displayed on painted house fronts such as may be seen at Ksan Village, a reconstructed Gitksan village which is a museum and cultural centre at Git-anmaaxs.

Houses own a series of territories (**lax̲'yip**) as well, which they take care of and which provide the sustenance of their people (Fig 2-3). These territories include hunting grounds, berry grounds, and fishing sites.

Hunting grounds often consist of drainage basins delimited by boundaries which follow the ridgelines. Fishing sites are areas along the major salmon-bearing rivers where fish could be taken by traditional techniques in large numbers, and usually included a smokehouse and camp for processing the fish. These may not be geographically contiguous with the hunting territories of a House group. Gitksan territory, and the area of the on-going land claim, is the sum of all the House territories belonging to Gitksan people (except those from Git-anyaaw, who have a separate landclaim). Village sites are surrounded by a territory belonging to a specific House, but each House within the village owns the plot of ground on which its **wilp** was constructed. In modern times, the surveyed reserves on which the villages are located are generally considered to be excluded from the territories which surround them (Harris 1994:72).

The ancient village of Temlax̲'aamit was a village of the Fireweed or Gisk̲'aast Clan; the name is translated by Barbeau as "Prairie Town" (from **lax̲'aamit**, see Ch. 3). The location of Temlax̲'aamit was in the area of the modern town of Hazelton, and it is said to have been sited on the long river flat beside the Skeena River opposite the mouth of what today is called Chicago Creek. The other three **Pdeek̲** are Frog/Raven (G̲aneda (western[6]) or Lax̲see'l (eastern)), Wolf (Lax̲ Gibuu), and Eagle (Lax̲ Skiik). Their histories link them with Xswinikstaat below Gitwingax̲, with Gisbayakws,[7] and with other early settlements (Marsden n.d.).

The **adaawak̲** (histories) of each **Wilp** are owned property, and may not be repeated without permission of the owners. However, some of these **adaawak̲** have been recorded in the past with permission of their owners[8] , and one may gain a general picture of the nature of events occurring in the histories of the houses. Specific supernatural encounters aside[9] , the **adaawak̲** tell in general of the origin of the Houses and their travels, their encounters with other groups (sometimes amicable, sometimes not), and the nature of specific disasters which sometimes befell the people. From these latter there is generally a lesson on how the moral order was transgressed in order to precipitate the disastrous event.

The Gisk̲'aast originated near or within present Gitksan territory (Marsden n.d., Harris 1974), apparently in the northern portion. The G̲aneda seem to have come from the North (Marsden n.d.; Solomon Marsden pers. comm. ca 1985), as have the Lax̲ Gibuu. The Lax̲ Skiik, present only in the Western village of Gitwingax̲, are relatives of the Kitselas people, a canyon Tsimshian group whose territories abut the westernmost Gitksan territories in the area of Legate Creek, about halfway between the modern town of Terrace and the village of Gitwingax̲. The Eagles appear to have originated in the north coastal area in the modern territory of the Tlingit (Harris 1994).

A group of related Houses forms a "side" or **wil'nat'aahl**[10] . It is the **wil'nat'aahl** that hosts the feasts **yuukxw**, wherein the histories of the group are told and witnessed by other **wil'nat'aahl** of the Gitksan and sometimes by neighbouring peoples as well (Marsden n.d.:15). These histories also serve to link the Houses to their constituent territories, for the events in the past of the people are always localized and occur in specific places. The names and histories of a territory constitute in some sense the "deed" of the territory; only someone whose place it is can know the names and histories of the place and has the right to recite them in the feasthall.

The Feast

Among the Gitksan, feasts are given for all significant social transactions. Feasts are a public forum in which shifts of status or other social events can be witnessed by members of the other groups. Feasts make manifest relationships of Gitksan society–in the arrangement of seating, in who serves, who contributes, who receives payment, who performs his or her **nax̲nok̲** (a ceremonial prerogative of re-enacting an ancestral supernatural encounter). Feasts also are the focus of much economic activity; much wealth is amassed for redistribution at feasts. As Daly (n.d.) and Harris (n.d. and 1994) have pointed out, this is a balanced reciprocity; what is paid out will be repaid in the future. There are several kinds of Gitksan feast, usually referred to in the literature as "potlatch". The local feasts are called **li'ligit**. Important feasts such as funeral feasts of chiefs to which dignitaries from other villages are invited are called **yukxw**. Peter Williams[11] of Kitwancool has likened the **yukxw** to a parliament; in the **yukxw** the important business of the Gitksan is conducted and witnessed. Today the most frequently held feasts are funeral feasts, which culminate a cycle of events surrounding a death and publicly declare the succession of the name of the deceased. This is usually followed a year or two later with a headstone feast. Another very important type of feast is the **bax̱maga** or pole raising feast, which honors the deceased chief of a House and reaffirms its ancestral history and relationship to the land (Art Mathews Jr. personal communication; Harris n.d.:39). In both of these types of feast, the reciprocity between Houses and groups of Houses is manifested. For example, in a funeral feast, the father's side purchases the clothing of the deceased, buys the casket and so on (Powell and Jensen 1980). The contributions are then acknowledged and repaid in the feasthall. Similarly, the totem pole which is to be erected is carved by a representative from the father's side, who is paid for his work.

Other types of feasts include naming feasts, marriage feasts, divorce feasts, and what in English are called shame feasts[12] . Shame feasts are given by persons of high rank "to wipe off the shame" if they suffer bad fortune like a drunk driving citation or a near drowning. As will be discussed further in Chapter 6, such events are not considered fortuitous, but are seen as evidence of insufficient care and self-control. Most of these types of feast are relatively uncommon at present.

Social Structure

I have mentioned above that Gitksan society is divided into **Pdeek̲**, called Clans by modern Gitksan and Phratries by most anthropologists. The **Pdeek̲** consist of a series of Houses, **Wilp**, which are based in a traditional village of origin, although not all members of the House may actually live in that village, particularly in the case of the Houses which belong to the now abandoned villages. The Houses, along with other members of the same **Pdeek̲**, host feasts or potlatches to which Chiefs and other members of the Houses of the other **Pdeek̲** are invited, making manifest membership in the different corporate groups and the balanced reciprocity of their economic relations.

For Gitksan individuals, there is a lifelong interaction between one's own side, the **wil'nat'aahl**, and one's father's side, or the **wilksi'witx**[13] . The **wil'nat'aahl** are relatives of one's own **Pdeek̲**, including first the members of one's own **Wilp**, and more inclusively related **Wilp**. The relatives on one's father's side are, because of matrilineal kinship reckoning, not of one's own lineage, but they are a group to which one is related, and which has continuing responsibilities throughout the life of a Gitksan person. The members of one's father's House, and other related

Houses of his **Pdeek̲**, constitute the **wilksi'witxw**. If reciprocal marriages have been practiced for a prolonged time, the **wilksi'witx** of one's father will be one's own **wil'nat'aahl**, representing enduring relationships between members of the two Houses or sides over the generations. Where a woman has not married into her father's **wil'nat'aahl**, there is a differentiation of functions between the father's side, and that of the in-laws (Harris n.d.). In Gitksan society, a whole series of functions are traditionally provided by the father's side or **wilksi'witxw**, which has important roles in the **yukxw** (potlatch), in carving totem poles, and in caring for the dead,[14] for which it is compensated by the **wil'nat'aahl**.

The **wil'nat'aahl** serves many functions for Gitksan individuals (Harris n.d., 1994). Many activities, like fishing, fish processing, or berry picking, occur with other members of the **wil'nat'aahl**. It goes without saying that the support of your **wil'nat'aahl** is necessary to activities like putting up a feast. Child care too is often shared in the same **wil'nat'aahl**. If there is need to arrange alternative long-term child care, a child's grandmother's sister is also **Tsiits**, and shares the grandmother role. The same situation applies to the mother's sister; she too is **Nox** 'Mother' and may raise the child in the event of the death of the mother, or in other situations of need. Aunts and Grandmothers share the responsibility of looking after and educating children. In traditional times, a boys were raised with their fathers until late childhood and then sent back to their own Houses to be raised by their uncles. If a boy was a future Chief, he might be sent for training to several uncles, so he would have the benefit of the knowledge and training of all of them (cf. Art Mathews Jr. personal communication).

There was no overarching social structure beyond the **Pdeek̲**. The villages, while of ancient origin and relatively stable composition and location, were not polities; there was no Village Chief[15] . The villages were in a sense a long term association of independent Houses, each with their Chiefs, which were ranked to determine a ceremonial precedence, but which gave no Chief authority over anyone but his own House members. Alliances were forged by political processes, and a network of personal ties and relationships, as well as long term kinship between House groups in different villages or even Tribes (in the sense of broad linguistic groups such as Ts'imsian, Nisg̲a'a or Haisla). Governance and resolution of conflicts between groups occurred by consensus in the feasthall. When these mechanisms failed violent confrontation or war might result, creating new grievances which could only ultimately be resolved in the feasthall.

Marsden (n.d.) analyzes the structure of Gitksan villages to be derived from the moiety system widespread among groups such as the Tahltan, Tlingit, Inland Tlingit, Haida, and various northern Athapaskan groups. She comments that, although there are four **Pdeek̲** (Clans or "Phratries"), in three of the modern villages, there are only two crests represented among resident **Wilp** (House groups), while the other four (including the two Northern villages) have three each. As mentioned above, there is a tendency for pairs of Clans to continue intermarrying, so that the two groups are **wil'nat'aahl** and **wilksi'witx** to their members.

Language

The Gitksan speak a language allied to Coastal Ts'imsian and to Nisg̲a'a. All three languages are known to their speakers as Sim'alga̲x̲. A fourth Tsimshianic language is called Southern Tsimshian by linguists (Dunn 1976 cited in Rigsby and Kari n.d.). The Gitksan language is very close to that of the Nisg̲a'a, and somewhat less similar to that of the Ts'imsian of the Coast.[16] Most Gitksan speak English, and younger people are largely monolingual English speakers.[17] Most of the elders still speak Gitxsanimx by preference. Some elders in the past were also bilingual with Witsuwit'en.[18] The Chinook trade jargon was also widely spoken in the past throughout the region.

The rich and subtle oral literature of the Gitksan has seldom been translated in ways which preserve its power and majesty[19] . Similarly, aspects of the philosophy, cosmology, and spiritual beliefs are difficult for elders to render into English. For these reasons, and for reasons of cultural pride and identity, serious efforts have been made in the past two decades to revitalize the language through school and community programs. Earlier efforts based on a western pedagogical approach with workbooks met with limited success, partly because too little time was devoted to practising speaking and listening to spoken Sim'alga̲x̲. More recent efforts have included experiments with immersion programs in Gitwinga̲x̲, with an immersion preschool with lots of contact with elders and an elementary immersion program, and with curriculum development in cooperation with School District 88, where Gitksan language and culture would be offered on an equal footing with other language programs, rather than as a supplement to the regular programming.

The language history of the region seems complex, with peoples of generally similar culture speaking languages of five different language families: Wakashan (spoken by the Haisla and Henaksiaala), Tsimshianic, Haida, Tlingit, and Athapaskan. Tlingit may be distantly related to Athapaskan languages as part of an ancient Na-Dene stock (Thompson and Kinkade 1990). The other language families are not at all related to each other or to the Na-Dene stock. A trend for regional borrowing of terms across these great language boundaries has been documented by Rigsby and Kari (n.d.). Further discussion of borrowing of plant terms between Gitksan and Witsuwit'en is given in Johnson-Gottesfeld and Hargus (in press). This linguistic diversity suggests complex patterns of migration into the area, and antiquity of human occupation. The linguistic borrowing bespeaks the long term and intimate contacts between groups of different origins, especially in the more peaceful contexts of trade and mutual feasting.

Early History: Evidence from Oral Histories and Archaeology

Marsden (n.d.) has done a detailed analysis for the Delgam Uukw court case of the unpublished Gitksan **adaawak̲** collected by Barbeau and Beynon (n.d.) and synthesized a general history from the **adaawak̲** of all the House groups. According to Marsden's synthesis, there seem to have been two general groups of early peoples entering the Skeena area; one group came from the North, somewhere in high plateau region near the headwaters of the Stikine, Skeena and Nass Rivers,[20] and gradually moved south to the Skeena River, and the other apparently moved up the Skeena and Stikine Rivers from the Coast, where they amalgamated with the peoples already there to form the ancestral Northwest Coast cultures. She places the migrations in the early postglacial, based on descriptions of a relatively treeless land, and on presence of extensive lakes in the Skeena and other valleys.

The Frog/Raven group has histories which tell of coming from the Blackwater (T'amtuutsxw'aks) area and settling in Gisbayakws (Kispiox), and Gitwingax̲ (Fig. 2-4). There are also relatives among the Wet'suwet'en at Kyah Wiget and among the Gits'ilaasxw people. The other Northern group was a Wolf/Eagle group, from which are descended many present Northwest Coast Wolf groups and the Haida Eagles. The Gitwingax̲ Wolves are descended from this Wolf/Eagle group; other related groups live at Gispayakws, Hagwilget and Gits'ilaasxw (Marsden n.d.:43).

Other early large scale migrations involved ascent of the river systems from the coast; the **adaawak̲** told by Thomas Wright speaks of travel all the way to the southern Yukon and then back southward (Marsden n.d.:64-65). Another history of migration recorded by Gordon Robinson, Haisla elder and chief, tells of the arrival at Kitamaat from the Owikeeno area of the ancestors of the Haisla; these then amalgamated with some early Tsimshian and a group of Haida to become the Eagle Clan of the Haisla, which also has relatives on the Lower Skeena and other areas of the Northwest. The important Dog Salmon **adaawak̲** apparently has its origin in this migration from Owikeeno; it is found in several Gitksan Houses and is commemorated on poles at Gitwingax̲ and at Ksan.

The origin of the Fireweeds or Gisk̲'aast seems to have taken place on the upper Nass River. In an early war between two rival villages, precipitated like the destruction of Troy through infidelity, a Raven group entirely exterminated the other (unnamed) group, except for one young woman in puberty seclusion with her grandmother. This ancestress was rescued by a son of the Sky God, to whom she bore four sons and two daughters. The children, bearing the power of their supernatural grandfather, returned to Earth to avenge their kin. They made war upon the Ravens and other peoples, including some coastal Tlingit, and amassed wealth and power before settling ultimately on the prairie near Hazelton to found Temlax̲'aamit to enter upon an extended period of peace.

Ives (1987, 1990:335-336) has argued for early development of salmon based Northwest Coast cultures in the canyon sites of Kitselas and Hagwilget on the Skeena, and similar sites on the Fraser. Kew (n.d.) had pointed out that these sites had a unique potential for development of subsistence systems based on harvest of salmon runs with simple technologies such as dip-nets; more sophisticated derivations from these simple dip-nets would allow emphasis on salmon fishing in the more difficult down river and estuarine environments such as the lower Fraser and the Coast. Ives finds it compelling to envision development of sedentism, political control and other aspects typical of Northwest Coast cultures beginning in these rich intermediate canyon localities, where salmon was a pivotal resource, and the opportunities for obtaining it in quantity in a reliable place spatially limited. Possibly, as many of the oral histories suggest (Ives 1990), successive groups of peoples moved downstream, once they had developed necessary technological sophistication, to flourish in the more stable but less easily exploitable coastal regions–where they also got first crack at the fish. Ives also finds aspects of the Tsimshian kin terminology suggestive of an earlier Dravidian type of kinship similar to that of a number of Athapaskan groups in the Interior, which bolsters the idea of an interior origin for Tsimshian people.

Archaeological evidence shows early occupation (ca. 4-5000 years BP at Kitselas and at Hagwilget (Ames 1979)). The following discussion of the Kitselas[21] and Prince Rupert Harbour sites is largely drawn from Ives (1990). Allaire and Coupland both conducted detailed excavations in the Kitselas area, which are discussed by Ives (1987, 1990). The evidence can be interpreted to suggest an early (Bornite) phase, with southern affinities at about 5050 BP; this is believed to represent a short term summer fishing camp. It has microblades which are flaked from obsidian from the Anahim Peak area 300 kilometres to the south (Ives 1990:338). Subsequent to this, there was a culture which had cobble tools and groundstone artifacts (the Gitaus Phase) and showed affinities to cultural remains on the Coast. The early component, at ca. 4300 to 3600BP, is contemporaneous with late Period III at Prince Rupert. The obsidian found in this site is from Mt. Edziza, 350 km to the north along the Stikine River. The obsidian found in contemporaneous sites in Prince Rupert Harbour was also from Mt. Edziza, suggesting trade with the Stikine and contact with the people of the Coast as well. No evidence of winter dwellings has been found, suggesting that the site was also a summer fish camp. After the Gitaus Phase, a subsequent cultural assemblage called the Skeena Phase is found both at Gitaus in Kitselas Canyon, and at Zone A of Site GhSv-2 in Hagwilget Canyon; the Skeena phase is believed to range from 3600-3200 years BP. These cultural remains show strong affinities with Interior assemblages in having well-made chipped stone tools, though some groundstone tools are also present.

Subsequent to the Skeena Phase, the Paul Mason phase at Kitselas shows the first house floors with cache pits, suggesting a year round village. No artifacts suggestive of social stratification are found at this time (3200-2700 BP), but the subsequent Kleanza Phase, at 2500-1500 BP does have labrets, slate mirrors, and slate knives and daggers, though no house remains have been found. No other archaeological remains have been found in Kitselas Canyon until the historic villages of Gitlaxdzawk and Gitsaex, which have Tsimshian cultural remains.

Prior to 3,500 BP the archaeological record in Prince Rupert Harbour area is relatively generalized, and there is no direct evidence for social complexity (MacDonald and Inglis 1981, cited in Ives 1990). After 3,500 BP, there is rapid buildup of shell middens in the harbor area. House outlines and post molds believed to support drying racks appear. Artifacts have been found which suggest connections to later Northwest Coast peoples, such as labrets, lip pins, ground slate mirrors, balls of red ochre pigment and nephrite adzes. Trade items such as dentalia shells and obsidian are prominent. The slightly later Prince Rupert II burials, believed to date between 2500-1500 BP, show evidence of warfare,[22] and grave goods show status differentiation in the community. Bentwood boxes and crest formline art (carved on a wooden box handle dated at 1600 BP) have been preserved there (Fladmark 1986) because of the wet nature of the site. After 1500 BP, a fully developed Northwest Coast material culture is found.

As few wet sites exist, much of the richness of material culture typical of Northwest Coast groups is not preserved in other sites; none of the wooden artifacts, mats or textiles can be preserved in oxidized sediments, nor have remains of plant foods been recovered. The sites in Prince Rupert Harbour are important in part because they are wet sites which preserve wood and basketry, giving a fuller picture of the life of the people living there.

During this general period, possibly circa 3000 BP (see below), the ancestral home of Temlax̱'aamit was occupied by the ancestors of the Gisk̲'aast. Some of the **adaawak̲** which tell of the times of Temlax̱'aamit refer to events which took place on or near Stekyoden (Rocher de Boule), a craggy and precipitous peak directly behind the modern towns of South Hazelton and New Hazelton. The most famous is the story of the Mountain

Goats of Temlax̲'aamit, which involves the revenge of the goats upon the people for disrespect and overhunting (cf. Harris 1974; Robinson 1962). This may refer to an event such as a large rockslide from the peak in which a number of hunters perished.

In 1985 the Gitksan-Wet'suwet'en Tribal Council asked for paleoenviron-mental studies in the area of Stekyoden which might reveal scientific evidence of the events narrated in the **adaawak̲** of the goats, and the **adaawak̲** about a lovely small lake called in English Seeley Lake. The lake experienced a sudden rise, which drowned several women who were picking berries, followed by the rampage of the Medeek, a supernatural aquatic grizzly bear living in the lake, who roared down the valley toward Temlax̲'aamit, tossing trees high in the air and leaving a wide brown swathe through the forest[23] . The narratives of Seeley Lake were recounted by Walter Wright, Chief Neas–D–Hok (Robinson 1962). Gottesfeld *et al.* (1991) present a synthesis of the geomorphological and soil studies undertaken by Gottesfeld and Gottesfeld, and the palynological studies of Rolf Mathewes, which shows evidence of a debris flow down Chicago Creek that blocked the outlet of the lake, causing its level to rise. The dam was apparently subsequently breached, and a debris torrent continued down the course of Chicago Creek to where it empties into the Skeena, right across from the ancient site of T'emlax̲'aamit. If these paleoenvironmental events are those narrated in the Medeek **adaawak̲**, this dates the occupation of Temlax̲'aamit to approximately 3500 BP.

Sometime during the occupation of Temlax̲'aamit a severe and widespread flood occurred; this flood is recorded in the oral histories of all the northern Northwest Coast peoples, particularly the Nisg̲a'a, Tsimshian and Tlingit, and in the oral histories of the Gisk̲'aast and other Gitksan clans. This flood is said to be responsible for some of the dispersals of other groups, including the peregrinations of the Git-anyaaw Frogs of the House of Gwi'nu'u[24] (Duff 1959; Godfrey Good, Sim'oogit Gwi'nu'u, personal communication) , and some Tlingit and Tsimshian groups. The Gisk̲'aast, however, weathered the flood where they were and re-established their former village site and hunting grounds (K. Harris 1974). This flood is said to have occurred before the rampage of the Medeek and the deaths at Seeley Lake.

At some point after the events of the Medeek, Temlax̱'aamit was abandoned in a year of severe and prolonged winter, again attributed to inappropriate human behaviour and supernatural retribution (K. Harris 1974; Marsden n.d. 118-120). Harris (1994) speculates the abandonment may be a result of general climatic deterioration in the later Holocene, which culminated in the historic Little Ice Age. The dispersal from Temlax̱'aamit resulted in the founding of the modern villages of Gijegyukwhla (Gitsegukla) and Gisbayakws (Kispiox), and the migration of groups to Git-anyaaw, Gitwingax̱ and Kyah Wiget (H. Harris n.d.:12), and the people of the Medeek crest downriver to an eventual settlement at Kitselas (Gits'ilaasxw) (Robinson 1962).

Recent History–Proto-Contact to Twentieth Century

In the time shortly before the actual arrival of Europeans in Gitksan territory, activity along the preexisting long distance trade networks seems to have intensified (Daly n.d.), resulting in the rise of warlords and fortresses which controlled important trails (Cove and MacDonald 1987 v.2; Figure 2-4). Fortresses are known to have been located at Gispayakws and Gitwingax̱ on the upper Skeena, at Gits'ilaasxw, and at Gitlax̱t'aamiks on the Nass River.[25] This was perhaps a result of the gradual filtering of metal knives and other European trade goods into the area through indigenous trade networks in the time before Europeans themselves had penetrated the interior.[26] Disease also apparently preceded the actual arrival of Europeans (Daly n.d.; cf. Dobyns 1993; Hunn with Selam 1990).

One of the most renowned and best studied fortresses is the Ta'awdzep near Gitwingax̱, with its legendary hero Neḵt of the G̱aneda. George MacDonald (1984; 1989) carried out excavations at the small round hill a few kilometres up the Kitwancool River from the present village of Gitwingax̱, and found remains of several wooden houses and fortifications which matched the descriptions in the oral narratives. The **adaawaḵ** of the origin and rise of Neḵt were recorded by Barbeau and Beynon (Cove and MacDonald 1987; Barbeau 1929, MacDonald 1984)) and more recently, by Jack Morgan of Gitwingax̱ (MacDonald 1984). The descendants of the inhabitants of the Fortress are the Gitwingax̱ G̱aneda, Lax̱ Skiik, and Lax̱ Gibuu. Neḵt himself is said to have been slain by the first musket to reach the Tsimshian.

The last wars before the actual arrival of traders or missionaries were fought with guns, best exemplified by the Tsetsaut War, in which the dispute between a Kitwancool chief, with his Gitlax̱t'aamiks and Gitksan allies and an Athapaskan speaking group which lived around Meziadin Lake in the upper Nass River drainage was resolved with a combination of old techniques of surprise attack, and the use of new weapons, guns.[27]

Apparently the indigenous forts all along the coast were abandoned by the 1830's. By this time, Fort Connolly and Fort Babine (originally called Fort Kilmaurs) had been constructed in the interior (Fig. 2-4), and Fort Simpson had been established north of Prince Rupert after the fort established at the mouth of the Nass to block Russian trade expansion southward had been abandoned (MacDonald 1984).

The Tsimshian chief Legeex̱ had gained much prestige and trade advantage by donating land to the Hudson's Bay Company for the new fort, and by marrying his daughter to the Chief Factor. For several decades in 19th century Chief Legeex̱ controlled trade up the Skeena River, and the Gitksan and Wet'suwet'en received trade goods through him, or by going to Fort Connolly or Fort Babine. The Tsimshian trade monopoly was finally ended in the 1860's when the Hudson Bay Company "purchased" the rights from him (Galois n.d.:9) and began river transport of goods to Hazelton for overland transport into the Interior.

In 1859, an American miner named Downie came into the Hazelton area looking for gold, and communicated with the colonial Governor Douglas about the potential of the Skeena region (Galois n.d.). The Collins Overland Telegraph Company was the first real incursion of Europeans into Gitksan territory; in 1865-1869, the company constructed a telegraph trail north from Quesnel across Wet'suwet'en territory and north from Hazelton. The construction of the telegraph, although it did not actually ever reach Siberia and was abandoned when the transatlantic cable was successfully laid, did result in construction of a road to what is now Hazelton. In the mid 1860's the Hudson's Bay Company briefly opened a trading post at Skeena Forks, which was to become the community of Hazelton. For the remainder of the nineteenth century, there was a small white settlement at Hazelton of perhaps 100 people. In the 1860's the Hudson's Bay company began to supply Fort Babine and its interior posts by water to Hazelton, and then by overland pack train. In the late 19th century

Hazelton was the gateway to the Omineca and Cassiar goldfields. Steam navigation replaced canoe transport in the 1880's. The late Agnes Sutton of Meanskinisht remembered seeing the first steamship to navigate the Skeena River to Hazelton in the early 1880's when she was a small girl (personal communication 1977).

One of the features of Gitksan and Wet'suwet'en life of the latter part of the nineteenth century was the high mortality from raging epidemics of disease, particularly smallpox and measles. There was an outbreak of smallpox in 1862 which caused high mortality, and a serious measles epidemic in the late 1880's (Galois n.d.). It is estimated that the population of the region toward the close of the nineteenth century was only a fraction of the pre-contact population, perhaps as low as one tenth.[28]

After the 1860's, fur trading and packing became economically important for Gitksan people. Once the technology of salmon canning reached the coast, the Gitksan participated in cannery work at the coast during the summer season. According to Galois (n.d.), although many able-bodied men and women went to the coast during the summer to work, the elderly and the children remained on the Skeena to harvest and preserve fish and berries. Vegetable cultivation, especially of carrots and potatoes, supplemented gathering of wild resources. Some of the elders I have spoken with portray the summers of their youth as following that pattern (Percy Sterritt and Solomon Marsden personal communication). Galois also points out that the indigenous economy continued throughout the period (as indeed it does today in modified form, see Daly n.d.) and people still harvested the resources of their territories with little interference from white society.

During the latter half of the nineteenth century, the missionaries arrived and began to vie with the traders for influence in the lives of the indigenous peoples. Galois points out that the traders and civil authorities did not initially object to the feast system, while the missionaries were united in finding this an ungodly activity. St. Paul's Anglican church in Gitwingax̱ dates from 1872, and is one of the older standing churches in the area. Anglicans, Methodists and Salvation Army missionaries all preached to the Gitksan people and found adherents. Several mission villages were founded in this period, notably Glen Vowel, Meanskinisht (below Gitwingax̱ at Cedarvale), Andimaul, and Carnaby. Many people from Kitwancool (Git-anyaaw) went north to the Nass River where there was a mission (Duff 1959:13). Andimaul and Carnaby were later abandoned when people resettled at Gitsegukla, and Meanskinisht has only two native families presently living it. Glen Vowell (Sigit'ox̲), however, is a large and thriving village which is still largely Salvation Army.

Some sporadic hostility between Native people and white intruders took place; the so-called Skeena River Rebellion in 1872 occurred because of the accidental burning of 12 houses and totem poles in Gitsegukla by a party of travelling miners. This closed traffic on the Skeena River for a time, but it was peacefully resolved when the Chiefs received a payment which they took as compensation for their losses from the Lieutenant Governor and Attorney General of the Province (Galois n.d.). Other incidents involved a failure to understand the Gitksan traditional law of responsibility for deaths, including the killing of a white man for the uncompensated drowning of his Gitksan canoeman, and the killing of a Gitsegukla shaman who was believed to be responsible for the death of the child of Kamaluk of Kitwancool, for which the Chief was subsequently sought by white authorities, and shot to death (Galois n.d.).

In 1889 the Babine Indian Agency was established. After the establishment of the Babine Agency, the first Indian Agent, Mr. Loring, was instrumental both in the surveying of reserves and restriction of Indian land use off reserve, and in the attempts to destroy the feast system (Galois n.d.). By the early 1900's reserves were surveyed for all of the Gitksan villages, although not without protest from the Gitksan (Galois n.d.).

The Dominion Telegraph Line to the Klondike was constructed in the late 1890's, following the alignment of the earlier Collins Overland Telegraph, and provided a major trail for access to and across the northern territories of the Gitksan. Indeed, living elders still refer to mileage points on the Telegraph Trail, and to the locations of its linesmans' cabins in describing locations in the northern territories.

Starting in the late 1890's, land settlement by Eurocanadians was beginning to impact the Gitksan. One impetus for the settlement was land speculation as the route for a northern railway was sought (Galois n.d.: 53). The Bulkley Valley was a prime area for settlement, and the modern town of Smithers was founded as a divisional point for the railway. In 1914 the

Grand Trunk Pacific railway was completed, uniting the northwest coast to the rest of Canada by rail. As it ran down the Skeena River, it traversed a number of Gitksan territories, and altered the north bank of the river downstream from Skeena Crossing, destroying some fishing sites and cutting off some backchannels which were important for salmon spawning and rearing. It also required movement of the graveyard in Gitwingax̱.

Recent History-Twentieth Century to the Land Claims Court Case

Social impacts of the first half of the twentieth century are detailed in a number of sources. The enforcement of the potlatch law represented a direct attack on the Gitksan social order; this was resisted to the best of the people's abilities, but led to clandestine feasts[29] (Sadie Howard personal communication) and some impairment of the passing of titles. Totem pole carving nearly died out, but was never completely extinguished, as it was among the Haida and Nisga'a people. The increasing white settler presence, particularly in the rich valley bottoms of the Kispiox River and along the Skeena and lower Kitwancool Rivers, impeded access to resources in valley bottom territories.

The policies of the Indian agency and missionaries resulted in many children being taken from their families for 10 months of the year (or longer) and sent to residential schools. These in general were mission schools; the school at Port Alberni, to which many Gitksan children were sent, was Methodist. In later years, large residential schools in Edmonton received many Gitksan children. In these schools, and in the Indian Day schools such as the one in Glen Vowell, Gitksan children were forbidden to speak their language (Levine and Cooper 1976; Albert Wilson, personal communication; Sadie Howard personal communication). Corporal punishment was used to force children to comply. Children were also separated from siblings, especially if not of the same gender. While the residential schools were not all bad, and some elders have fond memories of their school days, the system worked hard to assimilate Gitksan and other Native children, to destroy the "backward" indigenous cultures at the roots by cutting the young off from the ways of their elders and instilling values more compatible with Eurocanadian notions. It also had significant impact on family structures, a factor which I have heard discussed a great deal in recent years in Native communities from various areas of Northern Canada (cf 1993 field notes, Fort Chipewyan).

The reactions of the Gitksan and Wet'suwet'en to the incursions of whites into their traditional lands, and their resistance to reserve surveying are documented in Galois (n.d.). The protests of various Native people in British Columbia about land alienation and the imposition of the reserve system were addressed by a series of Royal Commissions in the late 1800's and early 1900's (Galois n.d.; Raunet 1984). Little substantive progress was made despite great efforts by Indian leaders. In 1927 fundraising for landclaims was prohibited by an amendment to the Indian Act (Raunet 1984), which caused such activity to diminish for a period.

In 1951, the sections of the Indian Act pertaining to the potlatch were repealed; subsequently feasting began to increase in visibility and importance. Fundraising for land claims was also made legal again, and resurgence of land claims activity in the Northwest was not long in following.

During the 1960's grass-roots efforts propelled a revival of Native art and culture through the founding of Ksan and the Kitanmax School of Indian Art. This local group, comprising both Gitksan and non-Native local residents, began to encourage collection of histories and traditional information. The land claim movement also began to gather momentum in the Northwest. In 1973 the Nisga'a lost the "Calder Case", their land claim court case, in Supreme Court; three justices ruled in favour of the Nisga'a, three rejected their arguments, and the seventh judge ruled against them because of a point of procedural error (Monet and Skanu'u 1992). Although the Nisga'a lost their case, six of the judges acknowledged the existence of aboriginal title. This recognition laid the foundation for the formulation of a new Federal land claims policy based on aboriginal traditional use and occupancy where no treaties had been negotiated (Frideres 1988; Morrison and Wilson 1986:537). By 1977 the Gitksan and Wet'suwet'en (then called "Carrier") had formed a joint Tribal Council and the Federal Government had accepted their comprehensive claim (Monet and Skanu'u 1992). The Gitksan and Wet'suwet'en began to engage in research to document their claim. Ten years later the Gitksan and Wet'suwet'en chiefs sued Canada and British Columbia for ownership and jurisdiction of their traditional territories in the now famous Delgam Uukw case, about which so much has been written. In 1991 Justice McEachern handed down a negative decision (McEachern 1991), rejecting the existence of unextinguished aboriginal rights. The Appeal Court decision in 1993 somewhat softened that position, granting that there were some unextinguished interests in the land while rejecting the claim to aboriginal title. After appealing to the Supreme Court, the Gitksan suspended this case for a time to enter into trilateral treaty negotiations with the governments of Canada and British Columbia. These were broken off in the summer of 1995, and have not been reopened to date. In the meantime, the appeal to the Supreme Court is in progress once again.

There is in the meantime also substantial progress in various "transfer" programs. The Gitksan have taken over their own health care service, and have also been moving toward an aboriginal justice program in the process of striving for self government. The Gitksan have chosen to revitalize and adapt their traditional House system as the basis for these new types of Gitksan government.

Traditional Subsistence and the Seasonal Round

The Gitksan year was closely attuned to the seasons, and still is to a certain extent at the present time. As the land and the availability of its resources change dramatically with the turn of the seasons, the life of the people must also change with the seasons. I shall begin my consideration of the seasons with late winter (Figure 2-5). When the snow pack is melting, overland travel becomes very difficult, and the rivers are not yet navigable by canoe. In the proto-contact period, this was the season of the long and arduous trek to the estuary of the Nass over the grease trail to fish and trade for oolachans and their highly valued and nutritious grease, or rendered oil. At this time of year, stores of dried fish and berries laid in for winter would be running low, and high calorie foods would be at a premium. Wintering steelhead could also be caught in deep pools in the side rivers, and beaver were also hunted for their meat and pelts, especially after introduction of the fur trade. As the spring progressed, but before the leaves of deciduous species opened, medicinal plants, especially barks for "wood medicine",[30] and perhaps yellow pond lily root could be gathered.

A bit later in the spring, greens such 'lava berries', or stonecrop leaves, and cow parsnip stalks could be picked. As the sap rises in the trees, the bark slips easily. This is the time to gather pine 'cambium' and hemlock 'cambium' for food, and cedar bark for basketry, mats, and clothing. Willow and maple inner barks were also collected at this season for basketry and lashing. When the first salmon, (spring salmon or chinook, *Onchorynchos tsawytscha*) ascended the river, this was the occasion for celebration and solemn observance of thanksgiving. [31] If this important duty were neglected, the spring salmon would be affronted, and return down the river, leaving the people to starve and suffer. Bear could also be hunted once they emerged from their dens in the spring.

The first berries to ripen are wild strawberries and soapberries. These ripen during the spring salmon fishing. Soapberries were and are collected in quantity for making Indian ice cream or **yal'is** (see Ch. 4), while strawberries are a supplemental taste delight, but not available in large quantities. Shortly after this, saskatoons, huckleberries and lowbush blueberries ripen. These are picked in quantity as soon as the bulk of the sockeye salmon run has passed and been fished and processed for winter storage.

Salmon fishing is, of course, the mainstay of the Gitksan people. Three species are traditionally fished in relatively large quantities (Morrell 1989). The spring salmon has already been mentioned above. It is the first and largest species to arrive. For the Gitksan, spring salmon fishing is partly limited by river stage. When the river is too high and muddy, with a great deal of moving debris, nets have to be pulled, and any fish passing at this time cannot be caught. River stage doubtless affected traditional weirs and traps as well, which would have been destroyed if set up when the river was at floodstage in mid June or early July. The next, and most important species of salmon for the Gitksan, is the sockeye (*Onchorynchos nerka*). Sockeye run in mid-July to mid-August. Two main runs ascend the river. The largest present stock is the Babine Lake sockeye run, which passes up the Skeena to the Babine River, and thence to the lake. Smaller runs ascend the Kitwancool River, the upper Skeena, and the Bulkley- Morice. Pink salmon, which begin to run in late July through August, are little used by modern Gitksan. Likewise, chum or dog salmon are not caught for their flesh, but are prized mainly for their delicious roe. Coho (*O. kisutch*), which run in September and October, were also caught and used fresh or smoked. Steelhead, an anadromous race of rainbow trout (*Salmo* *gairdneri*), are also considered a salmon, and can be caught in summer or fall, or, as mentioned above, in the late winter period.

Traditionally, weirs and basket traps, or large and elaborate log traps which could withstand the force of the waters in the rocky canyons were the main means of catching salmon. Dip nets or small nets deployed through the ice in winter were other means of catching salmon and trout in smaller waters.[32] Since the early years of this century, gill nets have been used, which has slightly changed the places which are suitable for fishing. Salmon were (and to some extent still are) carefully cut and smoke dried in smokehouses, traditionally located at the fishing site to facilitate processing the large quantities of salmon before it spoiled in the summer warmth. Generally the women processed the fish while the men fished. Some fish camps still operate today, where large numbers of family members extending over several generations all work together and enjoy the summer's bounty. Other families process their fish at home in the villages at the present time.

After the main sockeye fishing in July and early August, families traditionally departed for several weeks of intensive berry picking on the mountain slopes, where large quantities of black huckleberries were picked and made into berry cakes for winter storage (see narrative of Olive Ryan Chapter 4). Berries were the most important carbohydrate source, and the most significant plant foods, in the Gitksan diet, and large quantities were stored for home consumption and for the winter feast season. Other late summer activities were hunting for mountain goat, caribou, and marmot, which might be undertaken by the men in the same general areas as the berry camps. Some berry picking and mountain goat hunting still takes place today.

In the early fall, berries such as cranberries and rose-hips were available. Large quantities of moss had to be collected and dried for winter sanitary needs. The men went out to hunt for deer, moose (in recent decades) and bear. In the fall various medicinal herbs are also gathered, especially for pre-hunting/winter-trapping purification, and to make 'wood medicine' to maintain health through the winter. The spiny woodfern rhizome, **ax̱**, was also gathered on the mountains in the fall. It was not considered ready for food use until the green fronds had died back. This was another source of carbohydrate for winter. Fall fishing included coho and steelhead, and provided a last source of fish to smoke for winter. Many other activities also had to be undertaken in the fall to prepare for winter, such as repair of traps and snowshoes, making snares, and collecting firewood. In the fall men also undertook purification with devil's club, and by fasting and in the sweat house.

The winter was traditionally the feast time[33] . Families generally came together in the winter villages, though during the time of the fur trade, men or whole families might be away for a time in the fall trapping out on the territories, return for the midwinter season to see people and feast (and observe Christmas after the arrival of missionaries). They might then return to the traplines until spring. Winter was the time for trapping marten, mink, wolverine, lynx and wolf for their furs. People also snared rabbits for food. In the village, winter was also a time for carving artwork and implements. If food ran short in late winter, one stop-gap to prevent starvation was to dig for ax̲ under the snow. It is possible to dig under the snow if one knows exactly where it is located, but very laborious, and definitely a measure of last resort. Hunting for moose and deer also provided food in winter. By March, people were readying themselves once again for the long and arduous trek to the Nass for oolachan, and the cycle of the year began anew.

The Modern Context

The area of Northwestern British Columbia where the Gitksan live is traversed by Highway 16 (Fig. 2-1). Local towns include Terrace, with a population of approximately 15,000, some 50 km. west of the edge of Gitksan territory along the Skeena River, the Hazeltons (combined population about 3000), at the southern edge of Gitksan territory in the area of the traditional village of Git-an'maaxs, and Smithers (population about 6000), some 60 km. south of New Hazelton up the drainage of the Bulkley River. Prince Rupert lies on the coast near the mouth of the Skeena River, and Kitimat at the head of Douglas Channel, roughly 150 and 80 km. from Gitksan territory by road respectively. Gitksan people live presently in these communities and in Prince George, Vancouver and other areas of the province, as well as in their traditional villages. There are some 5000 Gitksan people at present (Harris 1994:15), many of whom still live in their traditional territories or in the nearby towns.

Contemporary employment within the region is primarily in extractive industries such as logging, in fishing, or in service jobs, including employees of the band offices, Office of Hereditary Chiefs, the health clinics, Gitksan consulting firms, or in contracting or local businesses. Unemployment remains relatively high for people living on reserve, and there are still high rates of transfer payments such as unemployment insurance or social assistance. In addition, the Reserve population includes many elderly people, and many children. Some proportion of younger adults leave reserves in search of job opportunities or education, although many people return, sometimes after absences of a number of years. A smaller proportion engage in activities like trapping for furbearers out on the land, usually as an income supplement. Many people continue to engage in the aboriginal subsistence economy on a part -time basis, especially the food fishery, fall hunting, and berry picking (Daly n.d.:103 and personal observations).

Health status of the Gitksan is similar to other indigenous groups in the general coastal region of British Columbia. Diabetes, cancer, obesity, depression, and substance abuse are problems for the Gitksan, as well as for many other indigenous and non-indigenous peoples. Fetal alcohol syndrome has affected a number of children where social breakdown has led to alcohol abuse in the mothers. Gitksan people are actively combating psychological problems and substance abuse through community programs and with the Wilp Si Satxw alcohol and drug treatment centre near the village of Gitwingax̲. Some nutritional problems result from the shift in diet and activity occasioned by year round settlement in villages, and diminished participation in the annual subsistence cycle, which exacerbate problems like diabetes, obesity, and heart disease.[34]

The Gitksan continue to look for recognition of aboriginal title and resolution of their outstanding land claim, and are exploring ways to develop an economic base which can support them in the context of Canada and the global economy of the late twentieth century. Long term relations with other people living in the Northwest, and relations with corporate economic interests such as Repap, the sawmill operator at Carnaby, remain to be settled. Much depends on the ultimate resolution of the land claim, and what sort of division of power between existing levels of government and the Gitksan may be worked out.

NORTHWESTERN BRITISH COLUMBIA

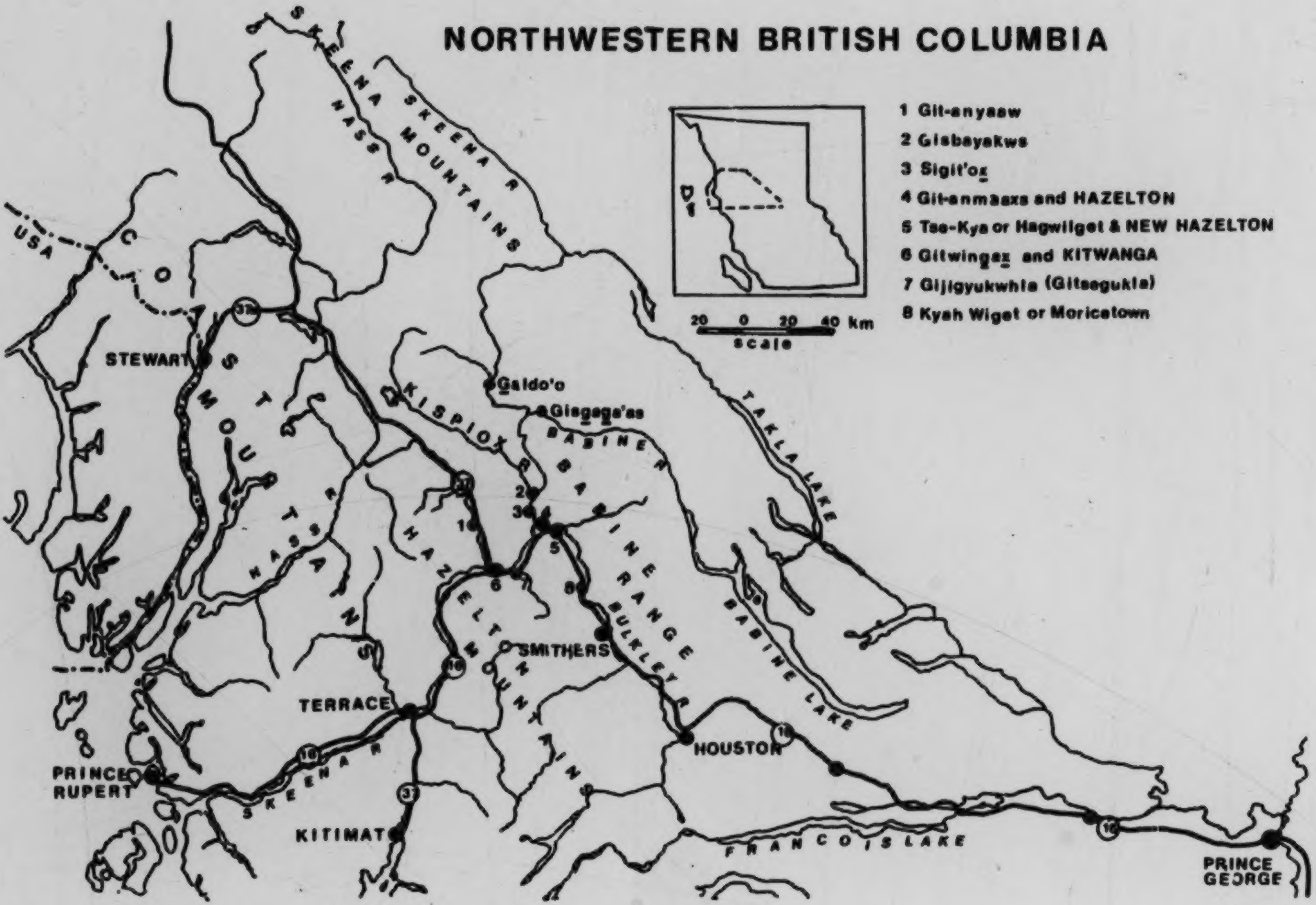

1 Git-anyaaw
2 Gisbayakws
3 Sigit'ox̱
4 Git-anmaaxs and HAZELTON
5 Tse-Kya or Hagwilget & NEW HAZELTON
6 Gitwingax̱ and KITWANGA
7 Gijigyukwhla (Gitsegukla)
8 Kyah Wiget or Moricetown
20 0 20 40 km
scale
SKEENA R
NASS R
SKEENA MOUNTAINS
USA
COAST MOUNTAINS
STEWART
37
G̱aldo'o
Gisg̱aga'as
KISPIOX R
BABINE R
BABINE RANGE
TAKLA LAKE
BABINE LAKE
NASS R
HAZELTON MOUNTAINS
SMITHERS
BULKLEY R
TERRACE
HOUSTON
16
PRINCE RUPERT
SKEENA R
KITIMAT
FRANCOIS LAKE
PRINCE GEORGE

Figure 2-3
Key to Gitksan Chief's Territories
(Redrawn after Monet and Skanu'u 1993 and unpublished map of Gitksan Treaty Office)

1. Skiikimlaxha
2. Niist
3. Kliiyemlaxahaa
4. Geel
5. Nii Kyap
6. Djogaslee
7. Gyoluget
8. Luus
9. Wii Minosik
10. Wii Gaak
11. Miluulak
12. Wii Gyet
13. Nii Kyap
14. Delgam Uukw
15. Wii Goob'l
16. Baskyelaxha
17. Niist
18. Gwinin Nitkw
19. Wii Gaak
20. Miiluulak
21. Tsa Bux
22. Antk̲'ulilbix
23. Wii Gyet
24. Wegyet
25.Tsa Bux
26. Haiwas
27. Ma'uus
28. Wii Eelast
29. Gwii Yeeht
30. Wii Mugulsxw
31. Gitludaahl
32. Yagosip
33. Gwoimt
34. Gutginuxw
35. Wosimlaxha
36. Nikateen
37. Luutkudziiwus
38. Spookw
39. Gyet'm Galdoo
40. Gaxsbgabaxs
41. Hanamuxw
42. Gwis Gyen
43. Wiis Dis
44. Gwagl'lo
45. Guxsan
46. Duubisxw
47. Sakxum Higookx
47a. Sakxum Higookx and Sima Diik
47b. Sakxum Higookx and Te 'Welasxw
48. Wii Hlengwax
49. Haalus
50. Haakxw
51. Yal
52. Dinimget
53. Lelt
54. Luulak̲
55. Haakasxw
56. Haxbagwootxw

TERRITORIES OF THE GITKSAN CHIEFS
EXCLUDING GIT-ANYAAW CHIEFS

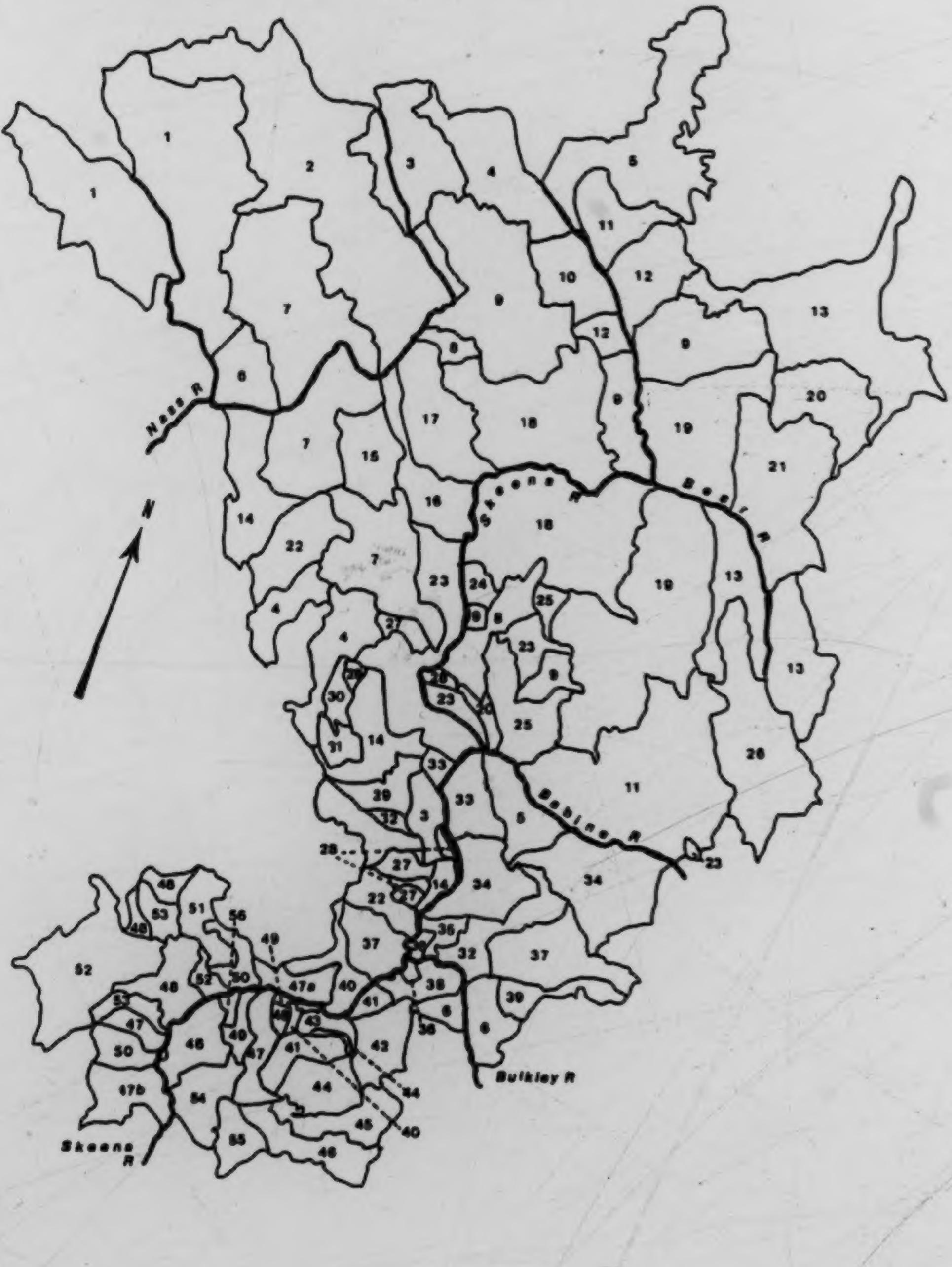
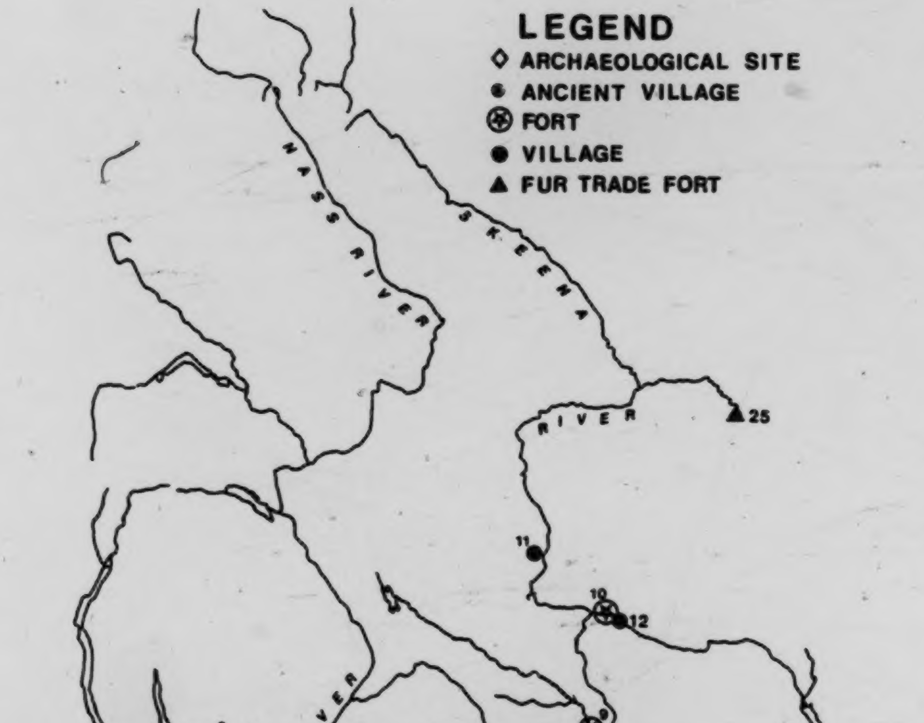

N
Nass R
Skeena R
Bear R
Babine R
Bulkley R
Skeena R

Figure 2-4

Map of the Northwest region showing archaeological sites, ancient villages, fort sites, recent villages, and fur trade forts.

1 Prince Rupert Harbour sites
2 Kitselas sites
3 Hagwilget Canyon site
4 Xswinikstaat
5 Temlax̱'aamit
6 Gitlax̱t'aamiḵs Fort
7 Gitsi'laasxw Fort
8 Ta'awdzep at Gitwingax̱
9 Gisbayakws Fort
10 Gisg̱ega'as Fort
11 G̱aldo'o
12 Gisg̱ega'as
13 Gitlax̱t'aamiks
14 Git-anyaaw or Kitwancool
15 Gitwingax̱
16 Gijigyukwhla or Gitsegukla
17 Gisbayakws or Kispiox
18 Git-anmaaxs
19 Hagwilget or Tse Kyah
20 Kyah Wiget (Moricetown)
21 Gitlaxdzawk
22 Gitsaex
23 Kitamaat
24 Fort Simpson
25 Fort Connolly
26 Fort Babine (Fort Kilmaurs)


LEGEND
◇ ARCHAEOLOGICAL SITE
• ANCIENT VILLAGE
⊛ FORT
● VILLAGE
▲ FUR TRADE FORT
NASS RIVER
SKEENA
RIVER
NASS RIVER
RIVER
SKEENA
1
2
3
4
5
6
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GITKSAN ANNUAL CYCLE

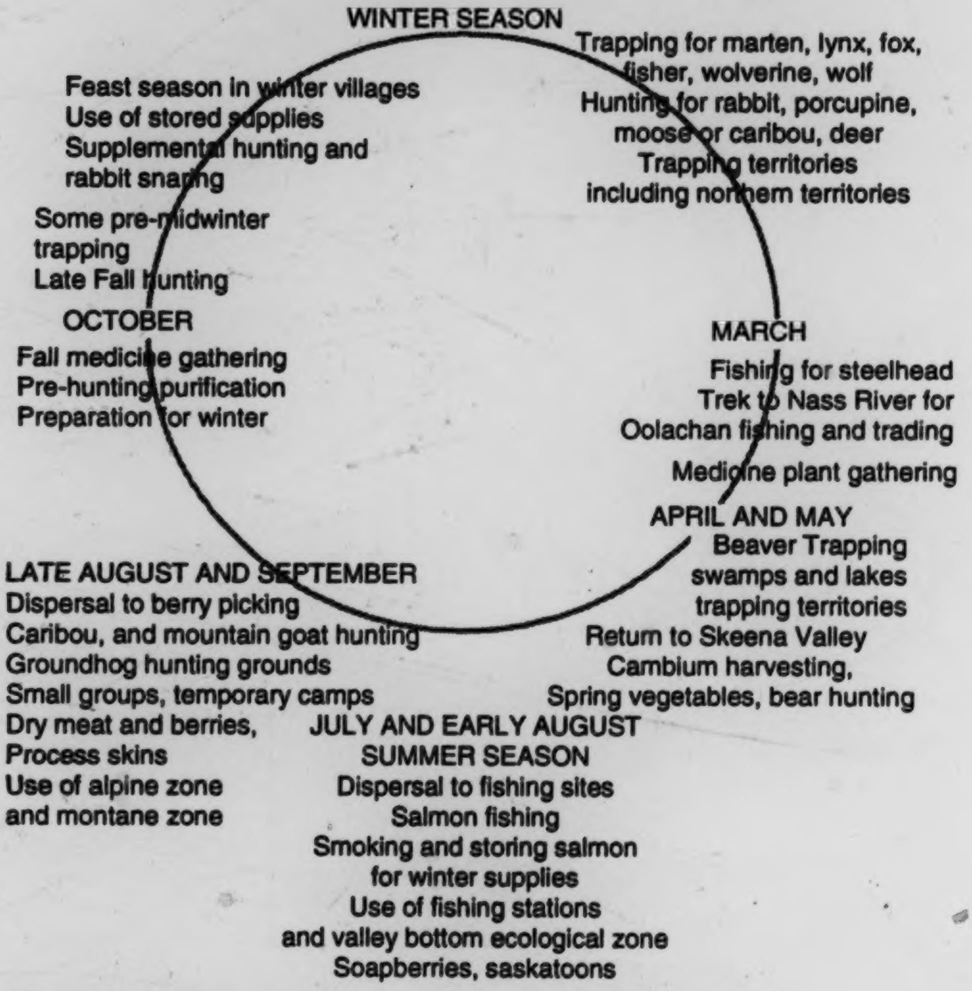
WINTER SEASON
Trapping for marten, lynx, fox, fisher, wolverine, wolf
Hunting for rabbit, porcupine, moose or caribou, deer
Trapping territories including northern territories
Feast season in winter villages
Use of stored supplies
Supplemental hunting and rabbit snaring
Some pre-midwinter trapping
Late Fall hunting
OCTOBER
Fall medicine gathering
Pre-hunting purification
Preparation for winter
MARCH
Fishing for steelhead
Trek to Nass River for Oolachan fishing and trading
Medicine plant gathering
APRIL AND MAY
Beaver Trapping
swamps and lakes
trapping territories
Return to Skeena Valley
Cambium harvesting,
Spring vegetables, bear hunting
LATE AUGUST AND SEPTEMBER
Dispersal to berry picking
Caribou, and mountain goat hunting
Groundhog hunting grounds
Small groups, temporary camps
Dry meat and berries,
Process skins
Use of alpine zone and montane zone
JULY AND EARLY AUGUST
SUMMER SEASON
Dispersal to fishing sites
Salmon fishing
Smoking and storing salmon for winter supplies
Use of fishing stations and valley bottom ecological zone
Soapberries, saskatoons

Figure 2-5
Annual Cycle Of Movement And Subsistence Activities Of The Gitksan in the nineteenth to early twentieth century (based on information from modern consultants). Coastal cannery and fishing work omitted.

Notes

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[1] The oolachan, or candle fish, is an anadromous smelt important as a source of oil and as the first fresh fish of the spring. Oolachan were a major fisheries resource for a series of coastal groups from Southeast Alaska into the Pacific Northwest. The fishery of the Nass estuary was one of the richest on the coast, and Tlingit, Tsimshian, Gitksan and Nisga'a all fished or traded for fish and oil in the oolachan season in March and early April. They were (and are) caught in dip nets and in fixed seine nets fastened to pilings driven into the river bed. The first fishing usually took place through the ice, though breakup is earlier now, and it often takes place from skiffs on open water now. The name is also frequently spelled eulachon in the literature.

[2] According to Gottesfeld 1985, there were two episodes of alpine glaciation in the Holocene; the more recent Little Ice Age, extending from about 1500 AD to 1800 AD, was the more extensive. Winter temperatures remained colder than in recent years throughout the nineteenth century.

[3] Caribou were formerly much more widespread. Caribou antlers can still be found on top of mountains in the Hazelton area such as Sadina (=Caribou) Mountain (Morrell personal communication 1985), and elders have seen old decaying caribou fences on ridges up the Kispiox Valley (Pete Muldoe interview notes 1994). Around the turn of the century, caribou became scarce, and moose, formerly unknown, moved into the territories from the north (Percy Sterritt interview notes 1985) and became relatively abundant. The reason for this dramatic faunal shift is not fully understood.

[4] The golden eagle is called "mountain eagle" **Skimsim**, by the Gitksan. It is a crest of Wixa of the Lax̱ Gibuu in Git-anyaaw.

[5] See Harris 1994, Marsden n.d. for detailed discussion.

[6] The Gitksan divide themselves along dialect and geographic lines into Western, consisting of the villages of Gijigyukwhla (Gitsegukla), Gitwingax̱, and Git-anyaaw or Kitwancool; and Eastern, consisting of Git-an'maaxs, Sigit'ox̱ or Glen Vowell, and Gisbayakws. The people from the

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two now uninhabited Northern villages G̲aldo'o and Gisag̲a'as, live variously in Gisbayakws and Git-an'maaxs at the present time, and are also Eastern.

[7] Also in use in the variant Ansbayaxw, which means 'hiding place'. This term refers to the site proper, not the village as a social group according to Bruce Rigsby (personal communication 1997).

[8] Men of Medeek told by Will Wright of Kitselas, Visitors Who Never Left, by Chief Ken Harris, the narratives recorded by Marius Barbeau and William Beynon, some of which have been published by Cove and MacDonald in two volumes (1987), and some of which are included in abridged form in Totem Poles of the Gitksan, Upper Skeena River, British Columbia (1929) and the narratives in Histories, Territories and Laws of the Kitwancool (Duff 1959) represent the corpus of published oral histories of the Gitksan and closely related Tsimshian and Nisg̲a'a groups. A large number of Tsimshian and some Nisg̲a'a narratives were earlier published by Boas (1916 and 1902).

[9] Marsden (n.d.) comments that the spiritual encounters commemorated in the **ayukws** generally represent an infusion of power into the world, which increases the **dax̲gyet**, or we might say, spiritual energy, of the Wilp. The histories of the people both reveal and enforce the moral order of the world, and serve as claim and deed to territories and their resources.

[10] The Houses of a **Wil'nat'aahl** are related in that they share common histories and thus origins, though the Houses have split at some time in the past, and thus are at present distinct entities. This term **Wil'nat'aahl** is variable in its inclusiveness, depending on context, and can vary from quite closely related Houses, or even members of one House, to all members of a **Pdeek̲**. See Harris 1994 for extended discussion of this term and its significance in Gitksan social structure.

[11] Unpublished typescript, "Yook Traditional and Aboriginal Law Feast Definitions" by Peter Williams, Hon. LLD, and Chief Go-Gwi'l geaw, Kitwancool, ca 1986?

[12] In the past there were also feasts to commemorate the coming out of puberty seclusion of young women, ear piercing feasts, feasts to put up

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house rafters, feasts for tattoos, welcome feasts, and various kind of spirit initiation feasts (Gitksan Interpreters Glossary:2).

[13] The **wil'nat'aahl** is referred to in English as a "side"; possibly this usage is derived from the arrangement of **Wilp** in traditional villages, or perhaps from the eating arrangement of the feasthall.

[14] Traditional functions of the father's side included carving the cradle for a first born son, and assisting in the education and care of girls in puberty seclusion.

[15] In recent times, Gitksan Bands, constituted by the Department of Indian Affairs, do have Band Councils and elected Chief Councillors. Gitksan are careful to distinguish these Chief Councillors from hereditary chiefs, or Simgiget (the plural form of Sim'oogit). Recent Gitksan self-government structures take the form of councils of Chiefs with employed staff, differentiated between Eastern and Western Gitksan, and are based on the traditional House structure.

[16] Nisga'a and Gitksan are now grouped together as Interior Tsimshianic languages (Bruce Rigsby personal communication 1997.)

[17] This is in large part owing to policies of assimilation and language suppression, especially in the residential and Indian Day Schools, see The Modern Context at the end of this chapter.

[18] This spelling of the language of the Wet'suwet'en people is preferred by Athapaskan linguists (Hargus personal communication).

[19] This became evident to me when I was privileged to attend a feast with the Nisg̲a'a in Canyon City in 1984 which was held for the purpose of resolving the overlap in the Gitksan and Nisg̲a'a land claims. At this feast, the late Stanley Williams, Gwis Gyen, recited in Sim'algax̲ the **adaawak̲** of the Tsetsaut war. The simultaneous translation provided by the Gitksan chiefs was powerful oratory and poetry, which I could only compare to Homer. Nothing I have read except Men of Medeek has conveyed the power and majesty of that oral rendition of an **adaawak̲**.

[20] This area is referred to in the **adaawak̲** as Lax̲wiiyip.

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[21] Kitselas is the common spelling of the location more accurately rendered as Gits’ilaasxw. The term means “rocky canyon”, of which Kitselas is the prime example on lower half of the Skeena River.

[22] Parry fractures of forearms and compression fractures of skulls from clubs are relatively frequent in the skeletal remains.

[23] The Medeek was seeking vengeance on the humans because of the disrespectful treatment of the remains of the beautiful speckled trout which live in the lake. The young men and women had initiated the practice of using the skeletons for headdresses while dancing, not appropriate for the fresh remains of beings who have given themselves for food.

[24] Gwi’nu’u is also spelled Gunuu.

[25] The Fort at Gitwingax̱ and the fort at Gitlax̱t’aamiks were on the ends of the intensively used overland grease trail, which focussed aboriginal trade in coastal and interior products, especially oolachans and grease, and hides.

[26] MacDonald (1984) comments that the first contact between Coast Tsimshian and traders was with Russians in the area between present Prince Rupert and Port Simpson before the arrival of the Hudson’s Bay Company in the 1830’s. Face to face trade with Russians occurred in the 1770’s and 1780’s, but they had already been present in the New World since 1741 and indirect trade had preceded their physical arrival. Northwest Coast peoples were apparently familiar with metals of all kinds by 1778, suggesting substantial indirect trade in metals prior to arrival of Europeans. At least for the southern Northwest Coast, metal may have arrived from Spanish sources by transcontinental indigenous trade by about 1700. Trade of Russian metal from Siberian indigenous peoples across the Bering Strait also likely predates arrival of Europeans on the northern west coast of North American. MacDonald (1984) speculates that the rise of the warlords and construction of fortresses may be related to the arrival of these new and precious metal tools.

[27] This war resulted in the extinction of the Tsetsaut as a people in the Interior; survivors apparently took refuge among the Tahltan of Caribou

Hide and Iskut. It also is the basis for the problematic "overlap" which developed between the Nisga'a and Gitksan landclaims in the 1980's, as the Kitwancool (Git-anyaaw) have relatives both among the Nass and Skeena peoples. A coastal group also called Tsetsaut apparently lived at the head of Portland Canal around the present settlements of Stewart, B.C. and Hyder, Alaska. The few remaining members of this group became amalgamated with the Kincolith people at the mouth of the Nass in the 1880's (Duff 1981).

[28] Census figures from Galois n.d. Appendix 4 report a reduction of the Gitksan population from just under 2000 to just over 1000 between the early 1870's and 1901. The first census was taken after the deadly smallpox epidemic of 1862, which had caused widespread mortality. The Gitksan population as of 1994 is estimated to be approximately 5000 (Harris 1994), and Harris suggests that the pre-contact population was similar or higher.

[29] One chief from Hazelton who openly held a feast was arrested in the early years of the potlatch law (Galois n.d.). Apparently in later years feasts were held fairly openly, though Galois (n.d.:93) states that in 1921 with a new Indian Agent, five Gitksan were arrested.

[30] See Chapter 4 for discussion of "wood medicine".

[31] Although no longer village wide events, there are still First Salmon Ceremonies held by smaller groups at the present. I attended a Lax̱ Skiik First Salmon Ceremony in early July 1994 at the opening of spring salmon fishing at Ritchie.

[32] I am uncertain if fish spears were employed by the ancestors of the modern Gitksan, or whether any pre-contact fishing with hook and line is known for this area. Certainly modern Gitksan do fish for salmon or trout in smaller rivers and streams with fishing poles today.

[33] Harris 1994 has pointed out that if a Chief died in the busy summer season, his funeral feast might be delayed until the people gathered again in the winter village.

[34] The greater susceptibility of North American indigenous peoples to adult onset diabetes and obesity may be in part a genetic adaptation to their

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previously extremely active lifestyle and low intake of carbohydrates relative to protein. See Chapter 1 for discussion of New World Syndrome.

Chapter Three

"A Place that's Good," Gitksan Landscape Perception and Ethnoecology

When I spoke to Art Mathews, Dinim Get, a Gitksan Lax̱ Gibuu Chief about the sacredness of the Gitksan relationship to land, he told me that I should attend a totem pole raising which was to occur the following weekend in the nearby village of Git-anyaaw. The sacred connection to the land was what the totem pole raising was all about, he said. A totem pole bears a series of crests, which are iconic emblems of events in the history of the ancestors of the Chief. The Chief (**Sim'oogit** or **Sigidimnaḵ**) wears his/her chiefly regalia, which also bears crests emblematic of the ancestors, and sings songs or tells histories which attest to the long relationship of the people with their territory. The other chiefs and people who attend and assist with the pole raising, and come to the pole raising feast, validate the relationship symbolized by the displayed crests and dances and recited histories and songs, and act as witnesses to implicit the compact between the people and their land. This relationship is not one of stewardship, which implies a certain inequality of the participating parties, but is one of mutualism. The land takes care of the people, who in turn, through their respect and use of the resources, take care of the land and enable the cycle to continue.

I said to Dinim Get:

> ...[Y]ou have to go to aboriginal title and land claims because it's like, you can't give up your land, because it was given to you by the Creator to be there and–is that right?

He replied:

> That's what our ancestors say, cause the land and language go together, that's your identification. You say you own this, your land, most of the place names are all in our language, hey, cause they say that the Creator gave it to us and he give us the names to go with it. Not by accident, but most of them, place names, are almost like totem poles to us. It might be an event that happened–in that certain area, so they just name the whole area. It's like a oral history....Place names are events that happen, that really happen to them. So that's why they really believe that their whole territory is sacred. You know, like I say, place name might have been a war or famine or whatever, and it's a constant reminder. All that the whole territory is like that. (transcript 9/15/96)

The Gitksan relationship to land differs from that of most Western peoples; for the Gitksan, people are part of the land, in an inextricable and even social relationship with it. The health of the land and of the people are intertwined, and there is, as we have seen, a spiritual value to land and the relationship to other species.

Vegetation science, landscape ecology, and geography deal with patterning of landscape from a Western perspective. Such scientifically ordered perceptions and classifications underlie various types of land management, having important ramifications for such fields as forestry and agriculture. Modern ecological classification schemes derive from Western natural science, and as such reflect both the tenets of Western empirically based science, and traditional European cultural beliefs about land and the relationship of people and land. Traditional perceptions of land and the relationships of people and land by other cultures can provide different, and perhaps complementary, lenses through which to observe and order the world, and to understand the place of people on the land.

Recently, I was strongly moved by reading a paper by Keith Basso (1990b) on Western Apache place names. He discusses there the disorienting totality of having to learn both an unfamiliar landscape and the ways in which a specific indigenous people perceive, order and talk about it (Basso 1990b:138). Unlike Basso, I did not come to the Gitksan land as a stranger. I had already lived in Northwest British Columbia for seven years before I began to work with Gitksan elders. As a long-term resident of forested and mountainous areas of northwestern North America with a strong background in botany, geography, natural history and formal ecology, the land already told me stories and was rich in my perception. I was also, like the Gitksan people, a traveller on the land, a forager, with my eyes alert for potential resources and camping places. When I started to work with Native elders, I began by using my own perceptions and knowledge of the land as a framework into which to slot the information they shared about plants used and places travelled.

The first transformation in my vision of the land had occurred when I worked with a Native fisheries management program a year or so before my formal work on ethnobotany began. At that time I came to perceive the significance of many of the inconspicuous truck tracks or foot trails along the rivers, and understand their significance as the overt signs of the myriad salmon fishing sites. Only then did I begin to see, with more Native eyes, that Xsan "the River" is the lifeblood of the land, bringing the riches of the salmon to sustain the people. The landscape took on new meaning for me. Gradually, my Native friends and acquaintances shaded in my perceptions of the land with their own stories about the location of a trapline or trail, the name of the person owning a cabin, or the story of an event told in their oral histories which was placed on some seemingly anonymous ridge or rounded hill.

I began to understand that for the Gitksan, the Nisg̲a'a, the Haisla, the Wet'suwet'en, there is no such place as wilderness. The world is not divided into the natural and the cultural, forever in opposition, wholly different in kind. Nature does not operate by a different set of rules than humankind for the Native people of northwest B.C. Nature is not there for exploitation or alteration at the whim of humans (the Eurocanadian pro-development view), or to be preserved from the ravages of humans who have no part in it (the Eurocanadian preservationist view). The landscape is home. Territories and people are inextricably associated. The history of the people is written on the land. The land is their larder as well as active partner in their long history. It bears witness to the successes and tragedies of the ancestors, lessons learned and passed down. It yields the resources necessary to sustain the people, but it must be acknowledged and treated with respect.

This background prepared me to examine my own understandings of landscape and of ecology, and finally led me to investigate indigenous concepts of landscape and ecological classification.

Gitksan landscape perception differs from that of western ecology. In Western ecology, plant communities are described based on the dominant species or geomorphic features [e.g. floodplain cottonwood forest, sphagnum bog, montane forest, hemlock forest, birch woods, black spruce swamp]. My attempts to elicit parallel terms in Gitksan have been met by confusion. Terms collected for ecological or habitat features, in Gitksan or local English dialects, include 'swamp' **lalaax̲'u**, 'meadow' or 'prairie'[1] **lax̲ 'amaaxws** or **lax̲'aamit**, and a generalized bush/forest term **sbag̲aytgan**. In addition, topographic features, such as 'stream' or 'river' (**aks, xsi-**), 'lake' (**t'ax, t'aam-**), and 'mountain' (**sga'nist**), are recognized and named. Trapline areas or territories may be referred to in English as a 'mountain'. Elder Kathleen Mathews said, regarding berry patch burning:

> Burn only on your own mountain. Not others. If you burn the other place you get the blame. (Interview notes 12/11/90)

Locations may be discussed as 'on the mountain' or 'halfway up the mountain,' as well. Describing berry patch burning, elder Peter Martin said, "They used to burn for berries halfway up the mountain" (Interview notes 4/24/91).

Description of the landscape appears to be primarily topographic, and to deal with presence or absence of: standing water ('swamp' **laalax̱'u**)(3-1); or trees (the absence described by the term **lax̱'aamit** or **lax̱'amaaxws**, 'place that's good, that has no trees' (Gottesfeld Gitksan Dictionary notes, 1988), 'prairie'; encompassing English terms such as meadow, clearing, avalanche track, alpine tundra) and the presence indicated by **sbagaytgan**, glossed by modern bilingual people as 'forest', which literally means 'among the trees'. Snow or landslide areas, also prominent in this mountainous and heavily forested environment, can also be named **hlo'o** ('(plural objects) slide'), and differentiated into snowlides (**'yagahlo'o**), rockslides (**hlo'osga'nist** 'slide-mountain'), or 'timber avalanche' **hlo'om gan** (this last a Chief's name found among the Wet'suwet'en; a borrowed Gitksan designation).[2] (Figure 3-1) The landslide or snowslide scar, a stripe of disturbed and deforested slope, can be termed **luu lax̱ suuk's**. The forest condition, far the most prevalent broad class of vegetative cover, appears to be comparatively unmarked. Forest can be referred to as 'place where there are trees'[3] , or as 'bush' (cf. 'woods' **gililix** Hindle and Rigsby 1973; **sbagadegantx** 'being out in the bush', roughly, forest, Pete Muldoe 7/19/94), which seems to primarily contrast with in the village, around people.[4] A term for 'burned over area', **ts'i'naast**, or **lax̱'anmihl**,[5] is also used. This can be seen as equivalent to 'seral', or 'immature'. By comparison with the number of forest types described by forest ecologists in the region, one could say that the Gitksan class of forest is "underdifferentiated" (see Figures 3-2 through 3-4). Berry patches are recognized with a distinct term, **ansimaa'y**.[6]

Gitksan landscape perception is organized with reference to "mountains" and "rivers", to drainage basins and divides, quite natural perceptions when the nature of the landscape is taken into account. Lakes are also salient features which are named and often figure in oral histories, sometimes as the abodes of supernatural monsters overcome by ancestors.

These latter orienting perceptions are intimately bound up with the way that the landscape, including drainage basins and river fishing sites, or mountains forming one side of major lakes or rivers, are delimited as owned properties of House groups. The names and histories of this land form the 'deed' to the property, demonstrating ownership in the feasthall, and are thus proprietary. For this reason, I will emphasize generalized features of landscape perception, and deal only in a generalized and superficial way with the rich and informative toponyms of the Gitksan.

General orientation is also by drainage and topography (Table 3-2). Basic orienting terms include **gew**, which has the sense of relatively open area near the river, that is, 'bottomland'; **gililix** 'uphill wooded area away from the river'; **geets'** downstream area or region; and **gigeenix**, upstream area (Rigsby 1995 personal communication).

'Vegetation' is approached by discussion of specific species and where they can be found. Plants are almost always discussed in terms of their uses (or their disutility). Generalized habitat indications such as "in the swamp" or "halfway up the mountain" suffice to indicate the ecological setting. Often a specific locality which the consultant has used will be indicated, usually on their own or a relative's territory, sometimes along a travel corridor such as the old Telegraph Trail. People can construct descriptions of places to parallel western ecological terms, such as **sbagaytgangan** 'among the trees/trees' to indicate mixed forest, or **spagaytgan am 'mel** 'among the trees/cottonwood' to discuss a cottonwood forest, but I heard such terms only in response to my own place type lists and diagrams, suggesting that they were verbal translations of my ecological classes, rather than types of places distinguished in Gitksen classification.

Perhaps as might be expected, there are terms which describe different parts of drainage systems for this quintessentially riverine people . Headwaters are referred to by a term which can be translated "in the back" (Vegh 1995 personal communication). Terms for features of rivers significant for fishing and navigation, are also found. These include rock canyon (**ts'ilaasxw**), 'bay' (**k̲'aldixgaks** or **wil luulamjax̲**[7]), 'sandbar?' (**wisax /wisex**[8]), 'waterfall' (**ts'itxs**), 'whirlpool' (**ts'a'lixs**), and 'back eddy' (**ts'oohlixs**).

Several topographic terms also exist, including mountain **sga'nist**,'hilly land' **lax̲ k̲'elt**, 'gully' **ts'imts'uu'lixs**, 'valley' **ts'imt'in**. There are also terms for small scale features like **gwanks**, 'spring', and **antl'ook**, a muddy place, where moose go, which are different from 'swamp' **laalax̲'u** or 'lake', **t'ax̲**.

Gitksan ethnoecology could be described as "interactive"; as people and the land are not separate, Gitksan speech about land includes people, their history, and the resource potentialities of the land as major themes. Specific places with their attributes are discussed, rather than generalized, abstracted statements such as might be made by a Western geographer or ecologist, or travelogue narrator. A person may refer to net sites, trapping areas, berry patches, or swamps good for moose hunting. The basis of the conversation about land is from the consultant's own experience, or that related to him/her by someone else in the community. It is not derived by deduction from general landscape characteristics. Discussions are not of the potential resources of cottonwood stands or pine forests in general, but where one might go, or where the narrator has gone, to obtain, for example, lowbush blueberries or good devil's club. Often reference is made to specific named sites on one's territory.[9] For plants of restricted distribution, such as stonecrop, the entire inventory of sites known to the consultant may be listed in conversation. Sometimes habitat information will include comments that one should dig certain roots in soft soil for easier digging, or get them from the "swamp" so they will be more succulent and better suited to the preparation of medicine.

The Gitksan share with a number of other non-literate peoples the conception of the landscape as embodying history (Rosaldo 1980, Cruikshank 1991a,b). The land is divided up into named entities which each serve as the visible witness of past events, from the adventures of the trickster/creator 'Wiiget[10] to the specific deeds of ancestors of specific clans and Houses. Elders will talk of specific resources and places, mixing personal history with oral narratives, in a way described by Cruikshank (1991b), often with reference to their own travels of the past. Each place has its names and its stories, and serves as a reminder and tangible evidence of the verity of the events recounted by Chiefs and elders, as suggested by the statement of Dinim Get at the beginning of this chapter.

Although the specific names are proprietary, general classes of toponyms can be recognized. Names may commemorate or indicate the specific adventures of ancestors or of 'Wiiget . Names may also indicate resources present on the land, also noted for the Sahaptin (Hunn with Selam *et al.* 1990; Hunn 1995) and numerous other North American native groups. The Shegunia River, locally known as 'Salmon River' is such a name; the Gitksan word is **Xsigunya'a** (stream#point# spring salmon[11]) (Rigsby 1986:67). Names may also describe a physical feature (as **'Wiisga'nist**, erroneously recorded as Weeskinisht on the government topographic maps, meaning 'Big Mountain'). Names can describe actions appropriate to a place. Two examples from unpublished material provided by the Gitksan Treaty Office translate as "place where you make wedges", and "place where you set the fish trap".

There are several words which can indicate place of, place where, or provide locative information, which commonly appear in place names (Table 3-3). Another word which forms part of many place names is **Xsi-** (and its variants **xsu-** and **xsa-**) the prenominal ablauted compounding form of **aks** (Rigsby 1986:), water. The names of streams and rivers almost always are preceded by one or another of these forms. Sometimes the word mountain, **sga'nist**, may form part of the names of specific mountains, but many mountain names do not contain 'mountain.'

Because of the proprietary nature of Gitksan toponyms, very few of the myriad Gitksan place names, except those of the villages themselves, have passed into use by modern Eurocanadians, or attained the fixed status of names on maps.

Discussion

A brief review of recent ethnobotanical and place name literature reveals little discussion of ethnoecological classification by other groups, though certainly many ethnographers must carry such an informal inventory of indigenous terms and concepts in their heads. A notable exception is a brief but cogent couple of paragraphs and landscape diagram for Sahaptin in Nchi'-Wána (Hunn with Selam *et al.* 1990:91-93). Many of the terms diagrammed by Hunn are primarily topographic or hydrographic ('saddle', 'snow-capped peak', 'cliff',[12] 'eddy'), but some have more biological content, such as 'wet meadow', 'burnt place', 'grove of tall trees' or 'rocky flat' (the habitat of a couple of important root foods). Hunn goes on to discuss the point I have made above, that most of the reference to place is more specific, and often deals with activities appropriate to individual places, rather than generalized words for large features or frequently occurring habitats. A short discussion of ecological terms of another foraging group, the Mexican desert-dwelling Seri, is given in Felger and Moser (1985:77). Several papers dealing with foraging peoples or shifting cultivators include small lists of ecological types recognized and named by the studied group, but without discussion. These partial inventories deal with dominant plant life form and post clearing successional stages[13] (Martínez A. 1987; Mora *et al.* 1985, Atran 1993, Vickers 1994), and altitudinal zonation and drainage status[14] (Sillitoe 1995), or, in the case of terms for riverbank and river terrace types reported for the Ainu, topography, forest status, and dominant species[15] (Watanabe 1973:40). Atran (1993) contains, in scattered form, some discussion of terms for topographic features and soils as well. A theoretical paper by Hunn and Meilleur (n.d.) sets forth the notion of traditional landscape classification under the rubric of ethnobiogeography, and gives examples from Hunn's Sahaptin material and Meilleur's French Alpine work.

An oblique approach to landscape perception by other groups may be made by examining orienting information. For example, the Kwakiutl oriented by 'up and down coast' (and/or rivers), and 'away from or toward the sea' (Boas 1934:9). The Hawaiians also recognized "**mauka**" and "**makai**" (toward the mountains and toward the sea). Palmer (personal communication) reports that upstream/downstream are important orienting terms for the Scwepmc of Alkali Lake, as indeed for the Gitksan. One can also "read between the lines" to glimpse landscape perception by the Dena'ina through the table of "place name generics" included in Kari and Fall (1987:33), which lists a number of terms including stems which indicate stream, lake, ridge, mountain, hill, and their subdivisions, such as river mouth; and telling terms such as **ken, -kena**, glossed as 'flat, clear area, swamp.'

Perhaps the paucity of information on relevant environmental variables recognized and named by peoples is in part because of the inherent "messiness" of the world in an ecological sense. Since ecology is by definition the interface and interaction of the biotic and abiotic worlds, and since history (including utilization and alteration of land, and random events such as blowdown or extreme winters) also effects what is manifested on the land, the patterns of topography and species association are very complex. This complexity has led to considerable debate among professional ecologists as to what the criteria of ecological classification should be, and what level of detail is appropriate. Indeed, it has been sharply debated if such entities as "plant communities" actually exist,[16] or whether they are constructs imposed on a messy continuum with few or no sharp discontinuities. Perhaps, therefore, this important area of inquiry is difficult to bound, and it is not obvious what types of entities might qualify as ethnoecological classes. Terms of ecological relevance range from strictly topographic and hydrological to vegetation *per se*. Hunn and Meilleur (n.d.) provide provocative evidence that, at least for some groups, there is an indigenous domain of words related to "place" which can serve to delimit the area of concern.

In my own efforts to establish the boundaries of inquiry into ethnoecological classification, I have included terms which refer to kinds of place, but excluded terms which describe types of substrate. I have, for example, included words for stream, lake and slide area as ecological terms, while I have excluded terms such as **yip** and **psa/pse** (soil and clay) from consideration as Gitksan ecological terms, because they are not primarily words which designate places.[17] It could be argued that stream, lake and slide area are simply topographic terms, and not ecological in nature. I have chosen to take a relatively broad approach to ethnoecological classification by including any words which indicate types of places (with the exception of words like **lax̱galts'ap**, village, or **sbilax̱noḵ** or **sbinax̱noḵ**, a type of supernatural place where a spirit can pull you in, which lack biological or geographic content).[18]

It is much less difficult to address the particular with reference to place and sense of place. The rich literature on toponyms has explored the various kinds of information coded by place names for different ethnic groups (Hunn 1995; Tom 1985; Cruikshank 1990 a,b; Basso 1990 a,b; Correll 1976; Müller-Wille 1983, 1993; Kari and Fall 1987; Kari 1989; Boas 1934). Such information reveals aspects of the human/land relationship of different cultures, and has also been used as supporting evidence in land claims negotiations and court cases (cf Hunn 1995; Müller-Wille 1983, 1993; and court case testimony of plaintiffs in Delgam Uukw vs. the Queen). Cruikshank (1990a,b) and Palmer (n.d.) have also explored the linkages between place and individual people's experience of land, including resources and events of personal history, for people in the southern Yukon and interior of British Columbia.

Indigenous North American place names tend to share several characteristics, found also in the Gitksan place names I have heard or read. In particular, the short discussion in McNeary (1976:59-60) and accompanying map key (:227-231) reveal the close similarity of Nisga'a and Gitksan place naming.[19] Place names may describe physical or topographic features (e.g. in Western Apache, Sahaptin, Northern Tutchone, Kwakiutl, Dena'ina, Ahtna, Inuit, Nisga'a, and Gitksan). They may mention plant or animal species metonymically, or make reference to resource species to be found in a named area (found in Sahaptin, Shuswap, Kwakiutl, Northern Tutchone, Nisga'a, and Gitksan). Place names may refer to historical events that occurred in the named area (as among Western Apache, Sahaptin, Nisga'a and Gitksan) or to events which happened in a mythological beginning time. Kari (1989), in a discussion of Alaskan Athabaskan toponymic knowledge, comments that the Ahtna and Dena'ina may name physiographic regions as well as specific smaller features; sometimes the local band names may reflect the physiographic regions they inhabit.

Place names are a sensitive index to the long term relationship of peoples to their landbase, and reveal information about ecology, cosmology and history. As Bruce Rigsby (1987:371) says:

> The Whites like to believe that they occupied a wilderness a century or so ago, which they are transforming and developing. They also presume to give their own names to the land, but the chiefs and elders who speak Gitksan know well that their homeland is a humanized landscape that has a myriad of place names and associated legends and historical narratives.

It is possible that, both for the ethnographer or ethnobiologist and for the members of a culture, that "types of places" may be covert, and that discovering a people's ecological classification may involve reading between the lines. People may know that, for example, low bush blueberries are often associated with low elevation lodgepole pine stands in relatively flat places without erecting the overt class "jack pine flat". As another example, a person may also know, in addition to naming a specific traditional gathering area for spiny woodfern rootstock, that one should look for it in a "ravine" (=**lax̱'aamit**) [see footnote 1] if one is attempting to find it in an area not well known to the consultant, or that it is frequently associated with **giist** (*Alnus crispa*).

It is out of this richness that we can learn the diverse ways that peoples see and know land. As McNeary aptly summarizes,

> To the Niska, the Nass valley is far from a wilderness. It is a collection of familiar localities, each with its own particular resources. The ownership of each place is known and many old village sites and fish camps dot the valley. There is a richness of historical and supernatural associations which make the landscape virtually a textbook of Niska history and religion. (McNeary 1976:61)

I would add that it is a textbook in ecology as well. The study of landscape perception and ethnoecological classification, and the study of toponyms, can reveal the intricacy and beauty of relationships of peoples and land.

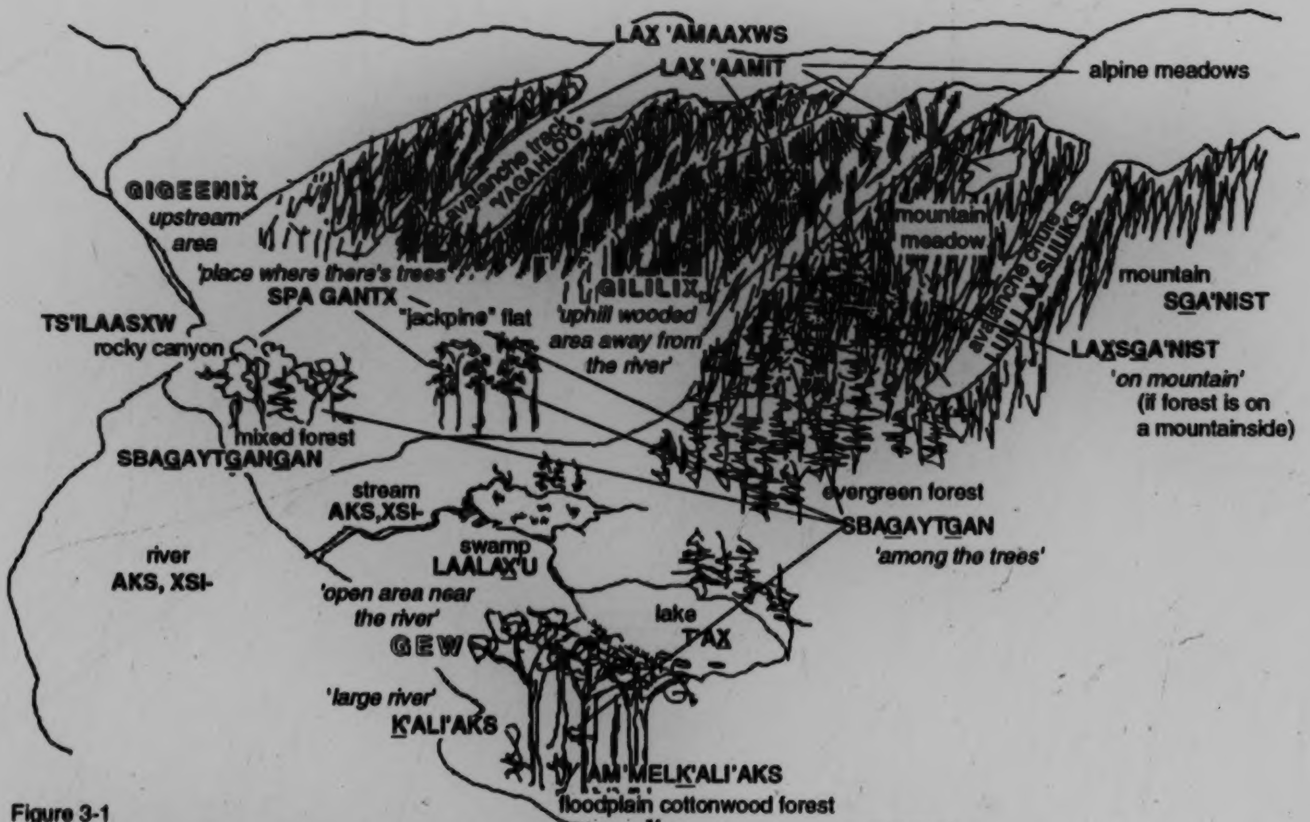
LAX̲ 'AMAAXWS
LAX̲ 'AAMIT
alpine meadows
avalanche track
YAGAHLOO'
GIGEENIX
upstream area
'place where there's trees'
SPA GANTX
"jackpine" flat
GILILIX
'uphill wooded area away from the river'
mountain meadow
avalanche chute
LUU LAX SUUK'S
mountain
SG̲A'NIST
LAX̲SG̲A'NIST
'on mountain'
(if forest is on a mountainside)
TS'ILAASXW
rocky canyon
mixed forest
SBAG̲AYTG̲ANG̲AN
stream
AKS,XSI-
swamp
LAALAX̲'U
evergreen forest
SBAG̲AYTG̲AN
'among the trees'
river
AKS, XSI-
'open area near the river'
GEW
lake
T'AX̲
'large river'
K̲'ALI'AKS
AM'MELK̲'ALI'AKS
floodplain cottonwood forest
GEETS'
downstream area or region
lmj '95

Figure 3-1

LANDSCAPE DIAGRAM with Gitksan landscape terms in boldface capitals, glosses in italics with single quotation marks. English habitat and topographic feature terms in lowercase non-italic letters. (Special river terms not shown)

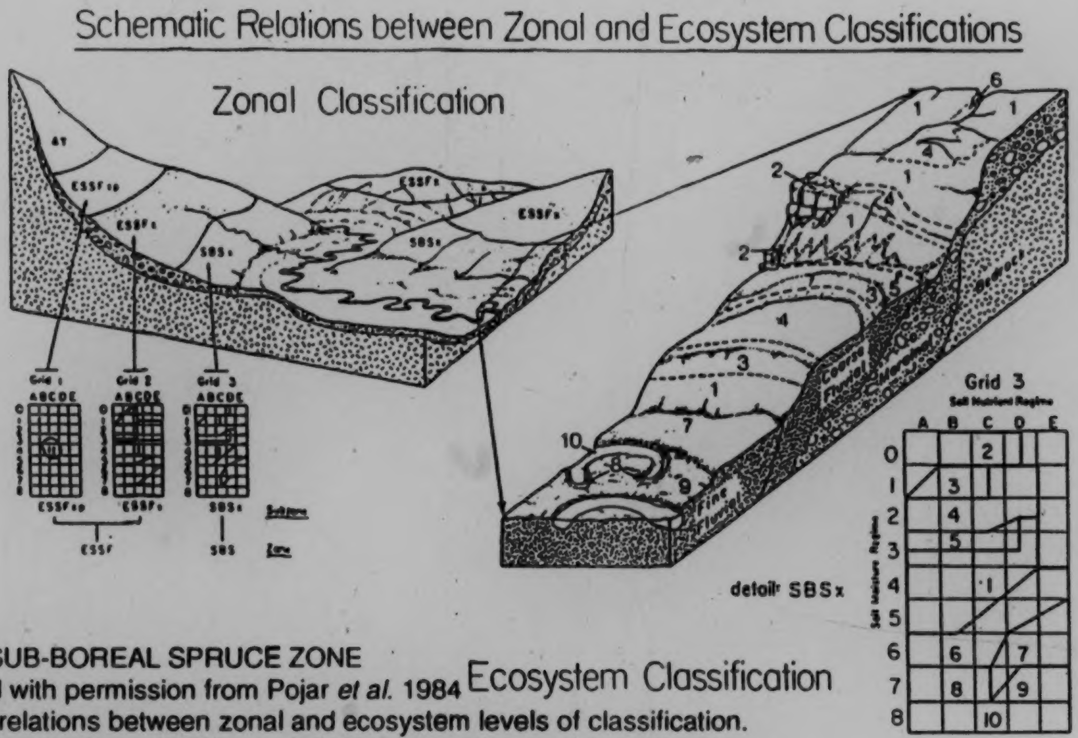
Schematic Relations between Zonal and Ecosystem Classifications
Zonal Classification
AT
ESSFxp
ESSFx
SBSx
Grid 1
Grid 2
Grid 3
ABCDE
ESSFxp
ESSFx
SBSx
Subzone
ESSF
SBS
Zone
1
2
3
4
5
6
7
8
9
10
Coarse Fluvial
Moraine
Bedrock
Fine Fluvial
detail: SBSx
Grid 3
Soil Nutrient Regime
A
B
C
D
E
Soil Moisture Regime
0
1
2
3
4
5
6
7
8
Ecosystem Classification

Figure 3-2 SUB-BOREAL SPRUCE ZONE
Reproduced with permission from Pojar *et al.* 1984
"Schematic relations between zonal and ecosystem levels of classification.
AT=Alpine Tundra Zone; ESSFx and ESSFxp=hypothetical forested and parkland subzones, respectively of the Engelmann Spruce-Subalpine Fir Zone; SBSx= a hypothetical subzone of the Sub-Boreal Spruce Zone."

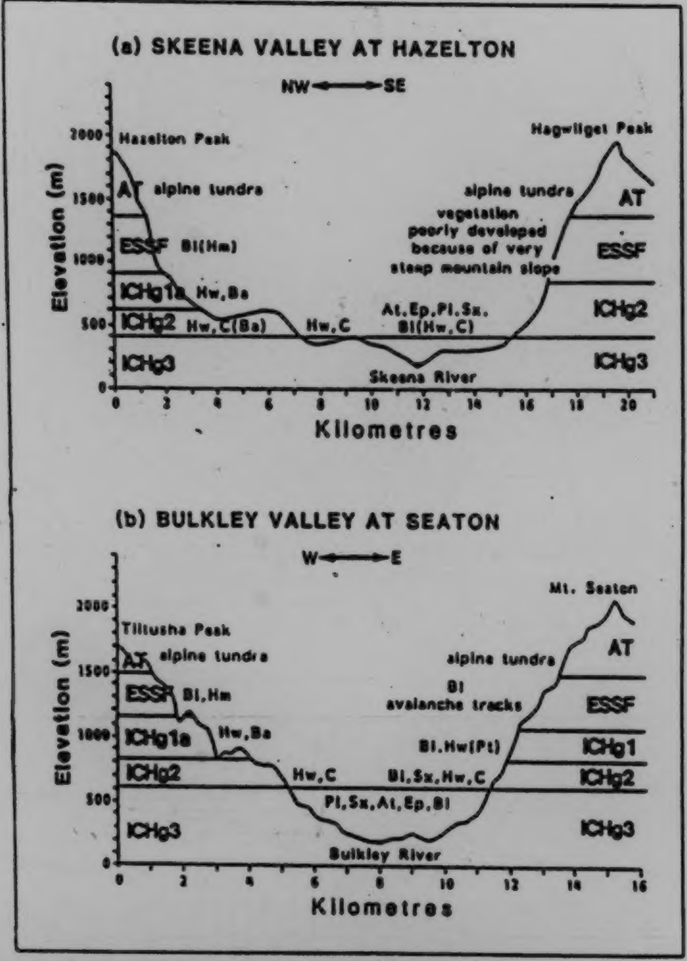
(a) SKEENA VALLEY AT HAZELTON
NW ← → SE
Elevation (m)
2000
1500
1000
500
0
Hazelton Peak
AT alpine tundra
ESSF Bl(Hm)
ICHg1a Hw,Ba
ICHg2 Hw,C(Ba)
ICHg3
Hw,C
At,Ep,Pl,Sx,
Bl(Hw,C)
Skeena River
Hagwilget Peak
alpine tundra
vegetation
poorly developed
because of very
steep mountain slope
AT
ESSF
ICHg2
ICHg3
0
2
4
6
8
10
12
14
16
18
20
Kilometres
(b) BULKLEY VALLEY AT SEATON
W ← → E
Elevation (m)
2000
1500
1000
500
0
Tiltusha Peak
AT alpine tundra
ESSF Bl,Hm
ICHg1a Hw,Ba
ICHg2
ICHg3
Hw,C
Bl,Sx,Hw,C
Pl,Sx,At,Ep,Bl
Bulkley River
Mt. Seaton
alpine tundra
Bl
avalanche tracks
Bl,Hw(Pt)
AT
ESSF
ICHg1
ICHg2
ICHg3
0
2
4
6
8
10
12
14
16
Kilometres

Figure 3-3 INTERIOR CEDAR-HEMLOCK ZONE
reproduced from Houseknecht et al. 1986 with permission
valley profiles showing distribution of biogeoclimatic units
ICHg3=Hazelton variant of the interior Cedar-Hemlock Zone
ICHg2=the Nass Basin subzone of the Interior Cedar-Hemlock Zone
ICHg1=a higher elevation cooler subzone of the Interior
Cedar-Hemlock Zone
ESSF=Engelmann Spruce-Subalpine Fir Zone
AT= Alpine Tundra
smaller letters are the symbols for dominant trees (C=western red cedar, Ba=amabilis fir, Bl=subalpine fir, Hm=mountain hemlock, Hw=western hemlock, Sx=hybrid spruce, At=trembling aspen, Ep=paper birch)

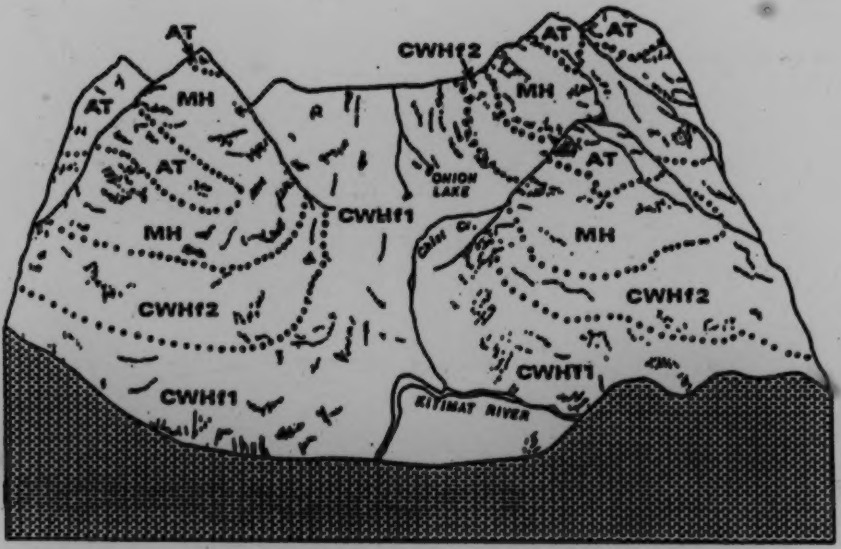
AT
AT
MH
AT
MH
CWHf2
CWHf1
CWHf2
AT
AT
MH
ONION LAKE
CWHf1
AT
MH
CWHf2
CWHf1
KITIMAT RIVER

Figure 3-4 COASTAL WESTERN HEMLOCK ZONE
reproduced with permission from Standish et al. 1987
Oblique view looking northward from the Kitimat River Valley
CWHf1= low elevation Coastal Western Hemlock Zone
CWHf2= higher elevation cooler Coastal Western Hemlock Zone
MH=Mountain Hemlock Zone
AT=Alpine Tundra Zone

Table 3-1
Gitksan Landscape Terms

Gitksan terms	Approximate English Equivalents	Translation	Source
hlo'o	"slides"	'it slides'	PM '94
enhloo'o [anhloo'o?]	avalanche track, place where it slides every year	'place-slides?'	AM '95
hlo'oega'nist	rockslide or landslide	'slide-mountain'	PM '94
'yagahlo'o	snowslide, avalanche		BA '88
hlo'om gan	"blowdown"? or a landslide involving trees?	'timber avalanche'	TT &ST '87
lax'aamit	'meadow' (snowbed areas and other treeless places)	'place that's good, that has no trees'; 'prairie'	BA'88
lax'amaaxws	'meadow' (alpine and other treeless flats)	'prairie'	PM '94
laalax'u	swamp		DG '87
luu lax suuk's	landslide or snowslide scar		AM '95
aks; xsi-, [xsan, xsu-]	river, stream	a form of the term for water	KH '95
k'ali'aks	large river; "cottonwood forest"	a form of the term for the upstream direction	BA '88;BR '95
t'ax; t'aam-	lake		BR '95
gwanks	a spring (not a swamp)		SH '92
antl'ook'	where moose go, a muddy place	'place of mud?'	SH '92
tl'ook'	mud		SH '92
gililix	forest	'woods'; tree covered area away from the river	H &R
laxk'elt gililix	wooded slope [may be a neologism]	"uphill wooded area"	AM '95
sbaaytgan	"evergreen forest"	'among the trees'	BA '88
sbagaytgan	forest		AM '95
sbagaytgangan	mixed forest		AM '95
sbagayt-am'mel	cottonwood forest [may be a neologism]	'among the trees, cottonwoods'	AM '95
spagadegantx	forest	'out in the bush, in the forest'	PM '94
spagantx	forest	'place where there's trees'	HH '95
am 'mel gallaks	floodplain cottonwood, cottonwood-along-the-river		AM '95
laxsga'nist	forest area if it is up a mountain		SH '92
laxk'elt	hilly land		SH '92
sga'nist	mountain		GW n.d.
ts'ilaaxw	rock canyon (as in Kitselas, people of the rock canyon)		AM '95
ts'imts'uu'lixs	'gully'		BR '95
ts'imt'in	'valley'		BR '95
ts'i'naast	burnt over patch (for berries or deer browse); clearing		BR'94
lax'anmihl	burnt over area	'place that is burnt or charred?'	PM'94
ansimaa'y	'berry grounds'		GI '87

Table 3-1
Gitksan Landscape Terms

Sources of Information
AM=Art Mathews, Dinim Get
PM=Pete Muldoe
BA=Beverley Anderson
TT=Tommy Tait
ST=Sara Tait
DG=David Green
KH=Kathy Holland
HH=Heather Harris
GW=Commission Evidence/Court Case information
BR=Bruce Rigsby
SH=Sadie Howard
GI=Gitksan Interpreters' Gitxsan Glossary

Table 3-2
Gitksan Terms of Orientation

Gitksan terms	Meaning
gew	open area near the river, cf 'bottomland'
gililix	uphill wooded area away from the river, cf 'slope'
gigeenix	upstream area
geets'	downstream area or region

Source of Information:
Rigsby 1995, personal communication

Table 3-3
Gitksan Place Terms

Gitksan terms	Meaning	Toponym Example	Translation	Source
miin	at the foot of; in front of	miinhl sginist	"at the foot of the pines"	BR '86; '95
win	place of, place where	win 'nashaast	'place where fireweed stands out (against a background)'	GW 5/92
gwin; gun	point extending into water	gwin'watsx	"otter point"	GW 5/92
lax̱	"on"	lax̱ yip	"on ground" = land, territory	BR 1986
an	where, place when	ansits'idipx̱st	"where (they) pick highbush cranberries"	GW 5/92; BR'95

Sources of Information

GW 5/92=a list of terms used in Court Case (manuscript on file at Gitksan Treaty Office)
BR '86=Draft Gitksan Grammar (manuscript on file at Gitksan Treaty Office)
BR '95=personal communication

Notes

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[1] Elder Jeff Harris Senior used the English term "ravine" as a gloss for this term, but he meant a treeless area, not a steep walled montane stream drainage.

[2] Gitksan is an Interior Tsimshianic language, and Witsuwit'en is an Athapaskan language related to, but distinct from, Carrier. The Gitksan and Wet'suwet'en have lived in adjacent areas and feasted together for a prolonged period of time resulting in numerous loanwords, especially of chiefly titles and biological terminology, which derive from the other language, in both languages.

[3] Beverley Anderson also placed two labels on a landscape habitat diagram I drew in 1988 as **sbaaytgan** (labelled by me as evergreen forest, shown on the mountainside) and **k̲'ali'aks** (labelled by me as floodplain forest, shown as cottonwoods on the flat beside the river). Later Art Mathews Jr. concurred in the use of **spagaytgan** for 'forest', and indicated that a cottonwood forest along the river could be described as **am'melk̲ali'aks**, 'cottonwood along the riverbank'. According to Bruce Rigsby (personal communication, 1995), **sbagayt gan** means 'among the trees' and is a descriptive, rather than conventional phrase. However, several different informants offered it as the general word for 'forest'. Rigsby states that **k̲'ali'aks** can be used to indicate a large river, such as the Skeena or the Nass. The **aks** means 'water,' 'stream,' 'river.' Thus, these terms may actually not indicate forest types, but may be descriptions of types of places. **Sbagaytgan** may be the same term as Pete Muldoe in 1994 translated as "out in the bush" **spagantx**.

[4] This sort of organizational axis can also be recognized in the Nuaulu (Ellen 1993) and the Kalam of New Guinea (Bulmer 1979). In addition, Tarpent has indicated that, for the Nisga'a, the term **gililix** has more the connotation of "backwoods", away from the settlement, than that of tree cover (Compton n.d.). Rigsby confirms that this is also true for the Gitksan.

[5] The presence of a term for burned over area is of obvious relevance; a burn can drastically alter the otherwise ubiquitous forest cover and initiate succession to scrub and immature forest. It is particularly significant in the ecology of important food plants such as berry bushes. The Gitksan,

like many other North American aboriginal peoples, managed landscape through controlled burning, particularly for berry enhancement (Gottesfeld 1994).

[6] Berry patches are places with good concentrations of harvestable berries; these are usually productive localities for species of huckleberries or blueberries. This term may refer more to territorial prerogative than to an actual vegetation type; a parallel term is also given for hunting grounds (**ansilinasxw**), and for types of places such as camping places and net sites in the list of "Territorial Words" in the Gitksan Glossary prepared for the Delgam Uukx Court Case (Gitksan Interpreters n.d.).

[7] The following list of river terms was provided by Bruce Rigsby, personal communication, 1995, except for the term for 'rock canyon'.

[8] Both Eastern Gitksan and Western Gitksan transcriptions for the terms are included, separated by '/'.

[9] The naming of places is primary, so when asked what the word for 'any lake' was, Pete Muldoe replied "they call it **t'ax̲**, any lake. But they different name on it, like... They have their own name on those, what they call it, lake, but just a lake is a lake. But to identify the name of the place where it's at, they have to name those lakes." (Pete Muldoe, interview transcript, July 21, 1992, p.15) Pete then proceeded to discuss the names of several lakes on his territory, describing them, their location and the etymology of their names.

[10] In Eastern dialect, this is 'Wiigat.

[11] The # symbol is used by Rigsby to indicate morpheme boundaries.

[12] The prominence of 'cliff' in Sahaptin is easily understood if one has ever travelled down the Columbia River through the columnar basalt cliffs of the immense flood basalt flows which fill the Columbia Basin, and through which all of the major rivers of the region have cut.

[13] Sierra Nahua terms pertaining to vegetative succession reported in Mora *et al.* 1985 include:

mil -planted area
xiujkaual--'*acahual*' with herbs and shrubs (acahual is regrowth on a fallow field)
kuaujijtik -'*acahual*' with trees
kuaujta -woods, forest

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ueyi kuauit *-'árbol grande' chaparral viejo y alto con árboles grandes?"* [tall, old scrub with scattered trees? or possibly old high forest??]

[14] Wola terms given in Sillitoe 1995:203 include:

iyshabuw: lower montane rainforest
bael: secondary forest regrowth
gaimb: canegrass
pa: swampy vegetation
mokombai: recently abandoned garden successions
em and ***aendtay***: gardens and houseyard environs
maendaim: alpine vegetation

[15] Terms reported in Watanabe 1973:40 include:

Type of Land	Ainu Term
woodland on river bank	***kenashi***
woodless field on either river bank or river terrace	***nup***
oak wood on river terrace	***komni tai***
woodland by the side of streamlets on river terrace	***nitat***

[16] This debate has continued since the early years of this century, when Frederick Clements (1916) put forth what has been called the 'super-organism' theory of plant communities. This model was shortly challenged by Gleason (1926), who advocated an individualistic model for plant species distributions. More recently, the European school of phytosociology has taken an approach focussed on methodology for accurate delimitation of vegetation communities (Braun-Blanquet 1932), while some American workers have advocated gradient approaches and vegetation ordination (Whittaker 1973), or so-called continuum theories (Curtis 1959; Curtis and McIntosh 1951), based on Gleason's individualistic distribution of species. Both gradient approaches and ordination continue to be used alongside classic phytosociological methods. Kershaw (1973) and Barbour, Burk and Pitts (1987) contain useful discussions of approaches to delimiting plant communities.

[17] However, the word for 'territory,' **lax̱yip**, does contain **yip** (soil) and can indicate 'on land'.

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[18] Both of these exclusions could be argued against, however. Bruce Morrison has presented extremely provocative Tibetan ethnogeographic depictions, which include the locations of spiritually significant sites and demons in an otherwise straightforward depiction of a terrain of mountains and valleys. Morrison commissioned paintings to graphically render indigenous landscape conceptions (personal communication 1995). Perhaps in a future, more expanded treatment of Gitksan landscape perception, such "supernatural" sites as **sbilax̲nok̲** should be included as 'types of places.'

It is also arguable that one should not exclude villages, with their focus of human activity and concomitant ecological disturbance, from landscape conceptions where one is not employing the nature-wilderness/cultural dichotomy. However, in indigenous conceptions villages are in some sense contrasted with out on the land, as I have commented earlier. Villages are foci of the human and social environment, and may also be locations which are not spiritually 'clean' (because of dogs and human wastes, as well as the possible malevolent intentions of other human beings), and hence unsuitable, for example, for the gathering of medicinal plants.

[19] The Gitksan and Nisg̲a'a speak closely related Interior Tsimshianic languages, their territories are adjacent and they have very similar cultures. They occupy generally similar environments, though the Nisg̲a'a territory extends to the estuary of the Nass, while the Gitksan territory is wholly riverine. The Nisga'a live on the lower and lower-mid Nass River, and the Gitksan occupy the mid and upper Skeena River drainage, and the middle and upper Nass. Territories of the upper Nass have been claimed by both groups and have been the subject of on-going dispute. Rigsby (1987:363-368; 1989:245-247) has recently argued that Gitksan and Nisga'a are separate languages because the speakers regard them as such and they have separate autonomous norms, although they are mutually intelligible. Speakers of one find intelligibility of the other increases quickly through language learning, similar to speakers of Canadian English learning to understand British dialects through watching television programmes that

feature them. Formerly, they were described as two dialects of one language.

Chapter Four
Gitksan Plant Uses

The Gitksan live in a northern forested environment, transitional between the dense cedar-hemlock forests of the Northwest Coast, and the boreal spruce, lodgepole pine and aspen woods of the interior plateau. Like other Northwest Coast peoples, their traditional subsistence strategy combined fishing for salmon, hunting of various mammals, and collection of plant foods, particularly berries. Other seasonal plant resources were also utilized: hemlock and pine 'cambium' or tender inner bark in the late spring season, the bulblets of the riceroot lily in spring and fall, the tender young flowering stalks of the cow parsnip in spring, and the banana-like rhizomes of the spiny woodfern over the dormant fall-spring season as a carbohydrate source.

The availability of concentrated and generally predictable seasonal resources allowed a strategy of intense exploitation of resources in season, combined with semi-sedentary residence in central winter villages, to which food stores were brought for the winter feast period. Of plant foods, dried berry rolls and boxes of whole stored berries were far the most significant in terms of weight and volume of food. The relatively high population densities, and semi-sedentary residence patterns enabled a degree of technological elaboration elsewhere more typical of horticultural peoples.

The Gitksan, in common with other coastal groups within the ranges of western red cedar and Sitka spruce, made use of the unique splitting properties of these large trees to construct plank houses and many wooden artifacts and tools like the famous decorated bent-wood boxes and chests. The soft and easily workable wood enabled a sophisticated woodworking tradition without saws or metal tools (see Stewart 1984).

The well-developed social structure and emphasis on accumulation of, and display of, wealth and prerogatives by these corporate groups encouraged development of artwork depicting crests (totem poles, crest decorated chests, canoes and house fronts, feast regalia such as carved frontlets (**amhalayt**),[1] and masks, feast bowls and spoons).

Another property of the red cedar and the related yellow cedar was also pressed into service by Northwest Coast peoples: its versatile bark. The inner bark was used for mats, baskets, and after shredding, for twined clothing. It also served for lashing and tying. The whole bark could serve for roofing or waterproof coverings.

The Gitksan had healing specialists,[2] as well as employing a variety of home remedies administered by family members. While the most spectacular healing specialists, the shamans or **halayt**, relied primarily on spiritual power, and dramatic healing displays[3] (Barbeau 1958), bonesetters and herbalists, as well as home practitioners, employed a variety of plant- or plant and animal-based medicines to treat sickness or injury, or to cleanse and restore health.

In addition, some plants are considered to be of cleansing and spiritual efficacy, and are still widely employed for purification and cleansing, as well as healing and protection by the general population. Hunters and trappers are particularly involved with some of the cleansing and purifying 'luck bringing' treatments. Plants were also formerly involved in some strengthening and puberty rituals for boys.

There is considerable overlap between plants which are used for foods or teas (Table 4-1) and for medicines (Table 4-2), although these uses will be separated in the present treatment. Aspen inner bark, for example, formerly served as food, and forms part of a medicinal cleansing decoction. Hemlock 'cambium', an important food, also was used medicinally to help in the safe elimination of swallowed sharp objects. Conifer needles, brewed as part of tonic medicines, contain vitamin C. In the Gitksan view, there is not a sharp separation between the health giving or health preserving properties of foods and medicinal plants; traditional foods are considered to aid both physical and mental/spiritual health. A number of medicines are also taken over prolonged periods as tonics or to prevent illness, rather than for symptomatic treatment of already existing ailments. [4]

The account of Gitksan plant uses which follows is largely taken from my own field data. I have collaborated over the past 11 years with Beverley Anderson, who is the source for some of the modern information reported here. I have also incorporated information from several recent published and manuscript sources (People of Ksan 1980, Wilson *et al.* n.d., Campbell *et al.* 1984, Mathews n.d.) and from the unpublished manuscript Ethnobotany of the Gitksan Indians of British Columbia compiled by Harlan I. Smith in the mid-1920's (Smith n.d.). Wherever possible, I have attempted to confirm information from these sources with living elders.

I have attributed specific information to specific elders where appropriate. Many times, a number of different elders have provided similar information about plant uses. In the Medicines section, I have not always attributed specific information to individual elders, out of respect for their privacy, and to avoid problems, given the sensitivity of some medicinal knowledge. As I discuss below in the introduction to the Medicine section, people feel responsible for the use of their medicines, and may not want to share specifics of how to make certain medicines with non-relatives.

FOOD PLANTS

Plants used by the Gitksan for food include root vegetables, green vegetables, numerous berries and fruits, and tree 'cambiums'.[5] Berries and other small berry like fruits were (and remain) by far the most important plant foods. Historically, 'cambium', especially hemlock 'cambium' was also quite important (Boas 1916:44). Hemlock 'cambium,' was processed and dried in cakes during its short season, and stored for use throughout the year. 'Cambium' was also traded with interior groups like the Wet'suwet'en.

In contrast with some other Northwest Coast and adjacent Plateau groups, root foods were relatively unimportant in the northern region where the Gitksan live. Such productive and nutritious bulbs as camas, and many other roots used by groups like the Coast Salish, Nuxalk, Thompson, Lilloet and Sahaptin (Gunther 1973, Hunn and French 1981; Hunn with Selam, 1990; Kuhnlein *et al.* 1982; Norton *et al.* 1984; Nuxalk Food and Nutrition Program 1984; Turner 1978, 1991; Turner and Kuhnlein 1983, Turner *et al.* 1990) do not grow in this region. However, the rootstock of the spiny wood fern (*Dryopteris expansa*) was significant to the Gitksan for its storage capabilities, and its availability in the winter season, and Smith (n.d.) reports that the riceroot lily bulbs were formerly gathered in quantity and dried.

Nutrient contributions and potential toxins of food plants, and implications of diet for health will be discussed in Chapter 7.

Root Vegetables

Only two types of root vegetables were widely used by the Gitksan, the rhizome of the spiny woodfern, *Dryopteris expansa*, and the bulblets of the riceroot lily, *Fritillaria camschatcensis*. Riceroot lily can be abundant in bottomland meadows along the Skeena, Kitwancool, and Kispiox Rivers. I have most frequently noted it in areas which have been cleared or thinned by burning, sometimes in association with abandoned garden plots. It was available over a fairly short season, and probably was a supplemental food, though Smith's consultants suggest that it was gathered in sufficient quantity to dry for winter. It has not been gathered for decades, and many modern elders do not remember it fondly, as the taste may be bitter. Spiny woodfern rhizomes were available over a longer period, although patches of harvestable rhizomes may have been more restricted in distribution. Other fern rhizomes, like that of the bracken fern, were not utilized by the Gitksan.

Some evidence exists that lupine roots were harvested and pit cooked in the past (Luke Fowler in Smith n.d.:117; Olive Ryan 8/4/95) .

gasx̱ "wild rice", riceroot lily *Fritillaria camschatcensis*

Riceroot lily bulbs can be picked in the late spring or late summer. They can be boiled or pit cooked. For pit cooking the bulbs were placed on top of hot rocks and covered with hemlock branches. This was topped with about 6 inches of dirt and a fire built on top. In two or three hours the bulbs were cooked. Modern elders often find the taste of "wild rice" unpalatable. The word **gasx̱**, means "bitter", or "awful tasting".

Smith's consultants indicate a spring gathering season, about June 15th. Olive Ryan suggested the end of May (9/20/96). Abraham Fowler told Smith that women "washed them clean, spread them on a mat and dried them for winter use. One woman would easily and quickly gather and dry as much as five or six hundred pounds" (n.d.:83). Robert Sampare mentioned serving **gasx̱** with grease; Luke Fowler mentioned use of hemlock inner bark as a sweetening, and oil.

ax̱ woodfern rootstock *Dryopteris expansa*

The spiny woodfern rootstock was the main root vegetable of the Gitksan. *Dryopteris expansa* does not grow to large size nor is it abundant in the central Skeena and Bulkley Valleys. Special sites suitable for fern rhizome gathering were known in different areas. **Ax̲** used to be especially plentiful and widely harvested near Gisg̲ag̲a'as and G̲aldo'o in the northern territories. Its storage qualities, resistance to freezing and availability in the winter season made it an important food out on the trapline. It also was an important survival food in late winter and early spring if people ran short of food or if the fish were late (People of Ksan 1980).

Jeff Harris Sr. (Luus) recalled the importance of **ax̲** in a brief retelling of a Gitksan legend about a period of starvation: "There in the famine some people eat **ax̲** [fern root]. They lived. Others go to get **xsuu'w** [hemlock 'cambium'] but they all died."

Gitksan elders indicate that wood fern rootstocks were gathered "half way up the mountains" in "meadows" **lax̲'aamit** (avalanche tracks, snow bed communities or slide areas). Kathleen Matthews of Gitwingax̲ said "You don't get it around here. Up the mountain. Halfway up. Where the slides used to be, big open place." (interview notes 11/24/87). Although commonly found in low elevation forests in the Sub-Boreal Spruce forest types (Pojar *et al.* 1984), only the larger, lusher plants growing in the open snow bed communities produce rootstocks of sufficient size and quality to harvest. Only certain places produced edible fern in sufficient quantity to harvest and these specific localities were owned and heavily utilized by those having the right to harvest them.

Spiny woodfern rootstock was an important source of carbohydrate. The fibre supplied by these plants was probably also important (Turner *et al.* 1992). **Ax̲** can be harvested in large quantities in appropriate localities and can be stored for long periods. It can also be harvested fresh throughout the winter season when other plant foods are unavailable.

On a collecting expedition in mid-November to a traditional collecting area near Git-anyaaw, one person was able to dig approximately 25 kilograms of unprocessed fern rootstocks in an hour and a half in unfrozen ground. The rootstocks collected at that time lasted more than four months in cold storage without detectable decrement in quality, after experiencing freezing outside before storage.

As the fern is collected for food only in the dormant season, knowledge of where to look for fern root and how to identify the proper fern root is important. The late Jeff Harris Sr. (Luus) determined the correct fern roots by first locating a fern plant by the withered stalks of the previous year's fronds. Then he dug or pulled out the rootstock. The correct fern has a large, compact rounded rootstock with "fingers" which are round in cross section, crisp but not woody, and pea green inside before cooking. Other ferns have tough fibrous roots which are difficult to dig. The "fingers" are woody and tan inside. Those of the lady fern are triangular in cross section.

The diameter of the rootstock can be felt too, which prevents harvesting plants which are too small. **Ax̱** plants have to grow for at least several years before they produce a rootstock which is large enough to harvest. When they are dug, this kills the plant. If too many plants are harvested or small rootstocks are taken, it may be many years before an area could be harvested again.

Jeff Harris Sr. described *Dryopteris expansa* rootstock:

> "my hand [fist] about that big I guess. . . when you take them out the root tapers down to the bottom, when you dig it out, and crooked. You have to take the little piece of the bottom part out because it's small. . . that [the old leaf base] would be about the size of your little finger. . .the banana like root . You take them off and peel it with your finger."

The fern rootstock is described as being black outside and green inside when raw (Figure 4-1), but turning to yellow or orange inside when cooked. The flavour is likened to turnips or squash. Elders remember the flavour of **ax̱** with pleasure. It is probable that the type of leaves or bark used to cover the rootstocks while pit cooking the fern influences its flavour; balsam (subalpine fir) boughs are not considered suitable because they are too resinous. Hemlock boughs or birchbark are usually mentioned as covering the fern rhizomes.

Jeff Harris Sr.described cooking spiny woodfern rootstock:

> When you prepare it, you dig a hole, a good sized hole. You place some wood on it and start a fire. You put some stones on the wood and heat them up. After they're hot, you settle them down on the bottom of the hole. Put something over it [boughs or moss]. And place the roots half on it. Just like putting apples and things together [place them upright, in growth position]. Close together and cover

> it up with some kind of boughs or leaves so it doesn't get too much dirt on it. . . Hemlock [boughs] (tape transcript 9/30/87).

After the pit is filled, it is covered over with dirt and a fire is built on top. This is done in the evening and in the morning the pit is opened. The cooked fern root is eaten with dried salmon roe and grease. The individual "fingers" are peeled and the inside portion eaten. The "core" of the rootstock can also be eaten. Apparently fern rootstock could also be roasted among the stones of a fire.

According to Jeff they used to tell stories about fern root in the community house. Some of these stories underscored the importance of fern root as a survival food. This is one such story:

> There was a family of four: a man and his wife and two children. The older one was a girl and the small one a boy of three or four. When they ran out of food in the spring time there was still snow upon the "ravines". They used a wood paddle or shovel or spade **ts'int'ul** to scrape aside the snow [on the "ravine"]. They find **ax̲**. The stems still come up under the snow. They gather it all up and roast it under fire.
>
> The girl is looking after the little boy at the camp while the mother is working [about 300 yards away]. The little boy cries. The girl is looking after the boy. The girl hollered to her mother "The baby is crying".
>
> The mother replied "**mi 'ooda lus todzin. Mi' 'ooda**". She meant put some **ax̲** in the ashes, prepare a bit of food for the boy.
>
> The girl got it wrong and threw her brother in the fire. She hollers,"I threw him in the fire but he kept on coming back!"
>
> The boy got burned.
>
> One day when the father went hunting for bears in their dens a stranger come to the young kids. He was all dressed in black . . .
>
> The [man] (really a bear) turned around [facing the kids] and was doing something from his back part. He gave the kids a piece of meat with bear fat on it from his ham and he went back [away]. The kids see him go that way.
>
> This man says to use oil or fat on burns as ointment or medicine and that's what they did.
>
> And the father went after where the man in black went. He found the bear and shot him. The bear sacrificed himself for humanity.

Jeff also mentioned that rendered bear fat could be used as the grease when eating fern root, which may explain the linking of the story of the bear offering his fat to the eating of fern root.

The importance of wood fern rootstock as a winter food is indicated by its adoption as an major crest by the house of 'Woosimlax̱ha of the Gisḵ'aast from Kispiox. The crest is called **'Wii Ax̱** "giant wood fern rootstock". It refers to a story about a giant woodfern root which was accidentally discovered near Gisg̱aga'as by a man after being mistaken for firewood. A large pile of wood had been gathered and burned all night. In the morning the giant **ax̱** was discovered in the ashes.[6]

Photographs taken by Marius Barbeau (Barbeau 1929) show two totem poles from Kispiox village in the 1920's bearing the "mountain fern crest" (**'Wii Ax̱**). One of these poles is still standing. The **'Wii Ax̱** is depicted as a series of upward pointing fingers in several tiers topped with four or five stylized fiddleheads, clearly recognizable as a depiction of a *Dryopteris* rootstock (Figure 4-2).

ḵ'awts carrots and 'wild carrots' (lupine) *Daucus carrota* and *Lupinus ?nootkatensis* or *L. ?nootkatensis* x *polyphyllus*

Today the tern **ḵ'awts** refers exclusively to the carrot, a domestic vegetable introduced by Eurocanadians, and cultivated in gardens since the late 1800's, or more recently, purchased from stores. However, there is some evidence that lupine root may have been called **ḵ'awts** in the early years of this century, and harvested for its roots. In more recent times the Haisla of Kitamaat village continued to eat the roots of what is probably the same species of lupine[7] without reputed ill effects (Gottesfeld field notes), despite the fact that lupine is widely reported to be poisonous in the literature (Kingsbury 1964).

Smith reported kāūch or kowuch as the term for lupine. Smith states that, according to Luke Fowler of Gitwingax̱:

> ...the whole root was eaten in the spring before the leaves came out and in recent years the beans were eaten. A fire was made, stones were heated. These were put in a hole in the ground covered with grass. A little water was put on the stones, so they would steam and the roots were put on the grass. They were covered with a mat woven of red cedar bark and earth, and left over night to bake.

> In serving these cooked roots oil of eulachon, salmon groundhog or bear was used." (Smith n.d.:117)

In 1995, I asked Olive Ryan (Gwans) about "wild carrots", which she had mentioned in the transcripts of her court testimony (#0843 Smithers Registry Proceedings at Trial v. 19:1242). I had brought her a freshly dug specimen of lupine from the river bank, with attached roots, and peapod-like fruits. After her initial hesitation, she decided that it likely was the 'wild carrots' (**k̲'awts**) she remembered from a smokehouse site belonging to her mother upstream of Gitsegukla called 'place of wild carrots' **Ansik̲'awts**[8] . She then recalled the roots having been carefully cleaned and cooked on hot rocks by the fire. She attributed a possible medicinal purpose to the eating of the roots.

Green vegetables

Few types of green vegetables were eaten by the Gitksan. Cow parsnip stalks, fireweed marrow and wild onions were the only types to be widely used, generally in the spring and early summer season. In addition, the leaves of stonecrop, *Sedum divergens*, (classed by the Gitksan as berries because of their red colour and round shape) were eaten in spring before the plant flowered.

Luke Fowler told Harlan Smith in 1926 that sheep sorrel (*Rumex acetosella*) was also cooked and eaten mashed with grease (Smith n.d.:102), although I have heard no modern reports of its use.

Although not strictly a "green vegetable", the nectaries of red columbine flowers were commonly eaten for their sweet nectar.

huukx, ha'mook̲ cow parsnip stalks *Heracleum lanatum*

Cow parsnip is locally called 'Indian rhubarb' or 'Indian celery'. These names point out the similarity of the portion eaten, the leaf stalk (**biins**) and flower bud stalk (**huukx**), to common introduced European vegetables. Cow parsnip stalks are only suitable for food for a short portion of the year in the spring. They are highly prized and still widely collected. After the flowering stalk exceeds about 40 centimetres in height, it is considered poisonous. Cow parsnip contain toxic chemicals called furanocoumarins which affect DNA. (Camm *et al.* 1976). Gitksan people are well aware of the potential effects of cow parsnip ingestion, and have mentioned persistent purple bruise-like marks and blisters as effects of consuming improperly collected and processed stalks. Kuhnlein and Turner (1986) have found that peeled young cow parsnip stalks contain about half the concentrations of furanocoumarins of unpeeled young cow parsnip stalks, demonstrating that preparation techniques reduce potential toxicity. Art Mathews Jr. and Olive Ryan both stressed that initial selection of the right kind of plant to harvest is also important in avoiding side effects (interview notes 9/96).

haast fireweed stalks *Epilobium angustifolium*

The young stalks of fireweed are a commonly used green vegetable by native peoples in Northwest North America. They have a sweetish or broccoli-like taste when eaten raw. Kathleen Matthews told me, "Eat it while it is still young. Take the inside out and eat it or mix it with soapberries." (notes, 1987). Luke Fowler explained that the inside, or marrow, was scraped out with a mussel shell, and eaten raw (Smith n.d.:155). It was apparently also sometimes used as a sweetener, as with soapberries, above (People of Ksan 1980:95), or as a binder in berry cakes (see berries below).

ts'anksa gaak̲ wild onion *Allium cernuum*

The name means 'raven's underarm odour' (People of Ksan 1980). Wild onion grows lush and large on southfacing slopes which have been burned (field observation 5/94). Modern Gitksan do not gather wild onions any longer, but in 1926 Luke Fowler reported that wild onions were eaten raw, and the whole plants were boiled with rabbit, meat or any kind of fish (Smith n.d. 81).

ilhee'em ts'ak 'bleeding nose' (in part) red columbine *Aquilegia formosa*

The yellow nectaries were bitten off the fresh flowers by children and sucked for a sweet treat.

Tree 'cambium'

'Cambium' or inner barks are widely consumed by indigenous peoples of northern and western North America (Eldridge n.d.; Gottesfeld 1992; Kari 1987; Kuhnlein and Turner 1991; Minnis 1991; Swetnam 1984). New phloem in spring is very juicy and high in sap; it contains high levels of sugars (Kuhnlein and Turner 1991; Gottesfeld 1995 and unpublished laboratory analyses). Dried 'cambium', especially hemlock 'cambium', was widely used as a sweetening by Northwest Coast peoples. Such carbohydrate sources are particularly important in areas which lack abundant nutritious root foods or grains, or other sources of sweetener like honey. Modern Gitksan consultants remember harvesting and consuming hemlock 'cambium' or 'sap' and pine 'sap' or 'noodles'; apparently both aspen 'cambium' and cottonwood 'cambium' were also eaten in the past (Smith n.d.:159-161). The Haisla of coastal Northwest British Columbia continued to eat cottonwood and hemlock 'cambiums' until the mid-twentieth century (Gottesfeld 1992). Hemlock 'cambium' is still collected and prepared by the Nisga'a for special occasions (Matt Azak, personal communication 1991).

One could determine if a tree had sufficient thickness of new growth to be harvestable for 'cambium' by poking through the bark on the north side of the tree to gauge the thickness of new tissue between bark and wood (Art Mathews Jr. 1994). If the north side had enough thickness, the whole tree would be good.

ksuu'w or **xsuu'w** hemlock 'cambium' *Tsuga heterophylla*

Hemlock 'cambium' was an important food because it was widely available and could be dried in quantity for storage and winter use. It was also traded to the Wet'suwet'en. Hemlock 'cambium' was either harvested by cutting the whole bark off of a standing tree in late May or June when the bark is loose or by falling a suitable tree and removing the bark from it once it has been cut down. A hemlock tree which had been stripped for 'cambium' is called **sgalaa'n getlest. Getlest** refers to the bark which has been stripped off. (Jeff Harris Sr. October 1987). The "sap" comes off with the bark and is about 1/8" thick. It is removed by scraping it from the bark. There was a special knife for cutting **xsuu'w** called **hehletsxw** (Figure 4-3). It was a semicircular blade fashioned from a piece of sawblade ground down until it was razor sharp. The outer convex surface was sharpened (Peter Martin 1988; Olive Ryan 1995). Once the 'cambium' was removed, it was boiled for a long time, or pit cooked for two or three days. It was then pounded in a wood block with a hole inside it. Jeff Harris Sr. suggests that a mallet made from a section of trunk with a branch was used to pound **xsuu'w** This softens the 'cambium'. Sugar could be added to the 'cambium' while pounding it. The pounded **xsuu'w** was then dried like berries on a rack on top of a fire (see People of Ksan 1980 for other details of this process and for a description of pitcooking the hemlock 'cambium'). To eat it, a piece could be broken off a hemlock cake and chewed or soaked and eaten. It was often eaten with berries. Hemlock 'cambium' is reported to taste sweet and pleasant (Ray Morgan 1988). It was a common food, although, as Olive Ryan commented "They save it for parties, they don't eat it all the time (notes 9/10/96).

ganix, k̲'anix or **k̲'anhix** pine 'cambium' *Pinus contorta*

According to Art Mathews Jr. (7/26/94), the term is a general term for 'cambium' scrapings from pine, subalpine fir, or spruce. **G̲anix a sginist** specifies pine 'cambium'. Pine 'cambium' seems to be the most frequently harvested type. Pine sap or 'cambium' is harvested at the same time as hemlock 'cambium', in late May or early June (Peter Martin 1988). Some people say a sunny day is good while others think the quality will be better on a mild, overcast day, or while it is raining. One of the elders who contributed to *Gathering What the Great Nature Provided* (People of Ksan 1980:80) suggested that harvesting early in the morning is best, while another found the quality of the strips good late in the day as well. According to Art Mathews Jr. (7/24/94), harvesting from a tree which is growing apart by itself rather than in a group will give better 'cambium'. A tree which is in the sun all day will give an earlier harvest than a tree growing in a shady gully. Harvesting a smooth barked tree will result in a cleaner product.

Pine 'cambium' is harvested by peeling the bark off a young pine tree and then scraping upward against the wood to remove the 'cambium' strips. They resemble flat, translucent noodles, and are sometimes called "pine noodles" in English. It is very sweet but perishable, and is used fresh by the Gitksan. It is not presently commonly used. The scraper for pine 'cambium' was manufactured out of the bone of an animal [probably a metatarsal bone of deer, caribou or moose] (Fig. 4-3) (Olive Ryan 1995).[9] In more recent times, a baking powder tin or spice can has been used for scraping 'pine noodles'; it has the advantage of catching the liquid sap as well as scraping off strips of new phloem (Art Mathews Jr. 1994).

spruce 'cambium' *Picea* x *lutzii* [10]

Spruce 'cambium' is also reported to have been eaten. It is sweet and mild tasting. It is harvested like pine 'cambium', and eaten fresh by Gitksan (Pete Muldoe, David Green, David Harris).

Berries

Berries were utilized fresh, as berry cakes, or stored in grease. Soft perishable berries like strawberries, raspberries, and thimbleberries were generally utilized fresh. Huckleberries, blueberries, saskatoons and soapberries were traditionally made into berry cakes. These were rectangular cakes perhaps 2m by .8 m by about 2 cm thick, which were carefully rolled up for winter storage and hung among the house rafters. Kinnikinnik berries, hawthorn fruits, and crabapples were stored whole or in grease in bentwood boxes. Bunchberries and red elderberries formed ingredients of berry cakes. Bunchberries are reported to have been an important binder in the berry cakes.

During the late summer, whole villages used to move up to berry camps to pick and dry berries for the winter supply. Olive Ryan (Gwaans) has described going to the berry camp with her grandmother Fanny Johnson (Ha'naamuxw) when she was a child (7/25/95 and 8/4/95). This camp was located in the berry ground (**ansimaa'y**) called Kslaawt ('below' because it is under the peak), which is up Juniper Creek in the Rocher Deboule, across the Gitsegukla River from the present village of Gitsegukla. Olive and her family came up from the now abandoned village of Andimaul on the west side of the Skeena River where she lived as a child, a distance by trail of at least 20 kilometres. According to Olive, all the berries were picked before processing began. This took about three weeks, beginning in early September when the fish processing was over on the Skeena River (9/20/96). While the berries were being picked, some men went up into the alpine to hunt mountain goat or hoary marmot, locally called groundhog.

The berries were stored in pits to keep them fresh until the picking was done. Then the fruit was put in very large bentwood boxes (about 30" on a side). These boxes were called **enlo'op**, "where there are rocks". **Lo'op** is the term for the hot rocks used to cook the fruit. The rocks were heated in a fire, picked up with wooden tongs, dipped in water to clean them, and placed in the berries. The fruit was layered with hot rocks (four rocks at a time) until the large box was full. Then a cedarbark mat was tied over the top to keep the steam in. The rocks were removed the next day. Olive recalls hearing the fruit boiling after the rocks were added and the mat was tied on.

After the fruit was cooked, it could be made into berry cakes. Berries were dried on split cedar racks called **sk̲’eex̲sin** (Figure 4-4). The racks were lined with skunk cabbage or thimbleberry leaves, carefully layered all in one direction. Two layers of thimbleberry leaves were needed to make sure there were no holes. The petiole and midveins of the skunk cabbage leaves were carefully removed to make a smooth flat covering. A fire was built under the racks, which were supported on pole frames. To turn the drying berry cake, a layer of leaves was put on top, and a second rack laid on. Then the whole thing could be turned over to dry on the other side[11] .People were called to drink the large quantities of excess berry juice remaining after the fruit was ladled onto the drying racks.

Gitksan people formerly made use of many more species of wild berries and fruits than they do at the present time. In addition to fruits like apples, oranges, peaches, apricots and domestic cherries purchased from supermarkets or itinerant fruit-trucks, several species of wild berries continue to be highly prized and gathered in relatively large quantities. Black huckleberries, saskatoons, soapberries, and raspberries are most frequently harvested. Picking black huckleberries may be the focus of a substantial expedition not unlike the travel to the berry camp of the early years of the century, such as that described by Olive Ryan above. People who can afford the gas and who have sound vehicles often drive 250-300 km. to the berry patch at ‘Meziadin’, the Burrage Creek burn on the upper Iskut River. Families and friends go picking together, including young children and elders who are still healthy. Those with jobs will schedule the trip on a weekend to fit it in around their work hours. People pick large quantities of black huckleberries, with supplemental high bush blueberries. They may set up camp and can the fruit there, using modern conveniences like boilers and canners and Coleman stoves, or people may drive back at the end of a long day's picking and can or freeze their fruit upon return to their homes.

The long truck trip to 'Meziadin' is partly the result of the changes in ease of movement and patterns of land use caused by construction of roads and introduction of motor vehicles, and partly a result of changes in land management practices caused by the B.C. Forest Service, which suppressed aboriginal burning practices, necessary for maintenance of good huckleberry patches, in the 1930's and early 1940's (Gottesfeld 1994). Olive Ryan commented that the berry patch she remembered as a child is all grown over now because "The Forestry don't agree with the Native People, you know....Big tree now." (tape transcript 9/20/96).

Soapberries, raspberries and saskatoons are usually picked near the villages or fish camps, and processed in camp or at home.

Modern Gitksan usually can huckleberries, blueberries and soapberries in glass jars. Raspberries may be canned, or made into jam or frozen.

Large accumulations of preserved fruit, as well as purchases of large quantities of fresh apples and oranges, were and still are made by Houses for memorial and other potlatches[12] (**yukwx**) such as pole raising feasts (**baxmaga**). Gifts of fresh and preserved fruit are prominent among the goods distributed to witnesses. In addition, fruit is often consumed by the family in the home.

soapberries **is** *Shepherdia canadensis*

The berries are widely gathered in northwest British Columbia for food for home use and trade in June and early July. Some people gather green berries while others prefer the ripe ones. These are whipped to make "Indian ice-cream" **yal'is**, a traditional dessert for feasts (People of Ksan 1980). Gloria Wesley says "make ice cream with a little bit of sugar. In the old days we use our hand to beat it." Four tablespoons of berries beaten in a small pail will fill it with soapberry froth (Figure 4-5). Modern cooks may use a small electric mixer to beat the berries if they are not in a camp. It is very important that the berries not come in contact with any grease, because grease will prevent them from whipping properly. The berries contain saponins which cause their foaming properties (Turner 1981).

Soapberries were traditionally preserved as dried berry cakes. To make soapberry cake "boil it til the seeds and berries are really cooked, thick".

Take an Indian tray [berry drying rack about 6 feet long] and put leaves on it. Stitch the leaves together with sticks". Thimbleberry leaves are used to line the tray. The cooked berries are poured on top of them. (Gloria Wesley February 1988) . Sometimes fireweed "syrup" or marrow was added to soapberries, as a sweetening or binder. A small quantity of black twinberries could be added to the froth to "make it taste nice" (Smith n.d.:184).

Soapberries are frequently served at feasts, and smokehouse dedications or first salmon ceremonies. They are traded with Coastal peoples as they do not grow on the northern coast, but are valued at potlatches. They are also enjoyed by families as a treat.

Soapberries also are used medicinally. Medicinal uses are described in the following section, Medicines.

strawberries **'miigunt** or **'miidoots**[13] *Fragaria virginiana*

Wild strawberries are eaten fresh. Raw strawberries were apparently formerly made into berry cakes and dried for winter use (Luke Fowler in Smith n.d.:88). Sometimes they were boiled briefly.

lowbush blueberries **'miiyahl** *Vaccinium caespitosum*

Lowbush blueberries are a favourite berry. These tiny berries grow on bushes which are usually less than 15 cm. tall. Formerly they were common in open areas in the valley bottoms, as well as occurring sporadically on mountain slopes up to the lower alpine. They were picked with berry pickers (Figure 4-6), which greatly reduced the labour of picking them. These preserve well in grease, and were also used for berry cakes. Smith's consultants mention that they were sometimes mixed with red elderberries, bunchberry, highbush cranberry, or wild cherry (**snaw**), but not chokecherry (**haluuts'ook̲'**) (Smith n.d.). The dried berry cakes were served with grease rendered from oolachan, salmon, groundhog (marmot) or bear fat. They appear to be less abundant than in former times, perhaps because of the lack of maintenance of berry patches by burning (Gottesfeld 1994).

highbush blueberries **'miigan** *Vaccinium ovalifolium*

Highbush blueberries are not preferred because of their relative acidity. According to People of Ksan (1980), these are chiefly utilized if the black huckleberries with which they grow are not very abundant. They are used with black huckleberries, as they often grow together. Formerly, they might be included in mixed berry cakes containing red elderberries and black huckleberries (see red elderberries)(Smith n.d.:186-187).

black huckleberries **simmaa'y** *Vaccinium membranaceum*

Black huckleberries are the most popular and highly sought berry. The name means 'real berry'. As mentioned above, black huckleberries are still widely picked, and canned or made into jam. A jar of wild huckleberries is an especially valued potlatch gift.

Black huckleberries were formerly one of the main berries to preserve in berry cakes. Gitksan people usually harvested these and low bush blueberries from berry camps in August. They were picked with a berry picker. Bushes with reddish and dry looking leaves were avoided, as too many leaves would be pulled off along with the berries. In traditional times black huckleberries were made into berry cakes on the site, as described in the introduction to this section.

According to Pete Muldoe, the best black huckleberries are large berries of a golden brown colour, and very sweet flavour. They are the real **simmaa'y**. The bushes with black fruit can be called **gadimis**.

According to Smith's consultants, black huckleberries were sometimes included in mixed berry cakes which might contain red elderberries, gooseberries, raspberries, or highbush cranberries. (Smith n.d.)

red elderberry **loots'** *Sambucus racemosa*

Red elderberry is an abundant shrub in found moist bottomland forests from the Hazelton area to the coast. It is more common to the west. Although they are widely reported in the literature to be poisonous (e.g. Hultén 1968), they are utilized mixed with other berries at traditional Northwest Feasts and I have never observed or heard of adverse reactions to ingestion of the fruits of the local populations of elderberries (see Turner 1975 for comments on edibility). They are always served cooked.

The Gitksan cook elderberries and serve them mixed with grease. The juice is saved separately, and can be drunk before eating. Red elderberries are little used by modern Gitksan, although they are still enjoyed by the Haisla in Kitamaat Village for jam.

People of Ksan (1980) suggests elderberries were dried alone as a sort of unsweetened jam by the Gitksan. Smith's consultants stated they were preserved as berry cakes, frequently mixed with other fruits such as black huckleberries, highbush blueberries, raspberries, gooseberries, or highbush cranberries (Smith n.d.). Cakes of mixed red elderberries and black huckleberries were called **maa'y anloots'**, and were apparently prized. "These cakes were the chief of the best foods of the Gitksan Indians. They were expensive and were used by the important and wealthy at feasts." (Smith n.d.:186)

gooseberries **dilawsa** *Ribes divaricatum*

Gooseberries were eaten fresh from the bushes. Raw gooseberries were served with oolachan grease according to Bob Robinson (Smith n.d.:137). Luke Fowler (Smith n.d.: 137) stated that they were also made into berry cakes; according to Fowler, black huckleberries were sometimes mixed with them for dried berry cakes. The cakes were soaked in water and served with grease.

crabapples **milkst** *Malus fuscus*

Wild crabapples were formerly gathered for winter storage; they occur far inland of their usual coastal range up the Skeena and Kispiox valleys. A large flat along the Telegraph trail near the northern village of G̲aldo'o is named "Milkst". Wild crabapples preserve well in grease and store well whole in boxes just as domestic apples do. They can be served in a bowl with grease, a mixture called **hlayim milkst**. (Solomon Marsden 1988).

kinninikinnik **t'imi'yt** *Arctostaphylos uva-ursi*

Kinnikinnik berries were extensively eaten because of their abundance and keeping qualities. One way to prepare them was to pop the berries on the stove top (David Green, Josh McLean 1987). The other was to mix them with grease in a bowl. This is called **hlayim timi'yt**. (David Green 1988). They were stored for winter in a bentwood box raw, covered with oolachan grease (Smith n.d.:209).

lowbush cranberries **’mii’oot** *Vaccinium oxycoccus*

These are found in small quantities in muskeg areas. According to Smith’s consultants, the berries were eaten raw, or were boiled in a bentwood box to make jam which was eaten with oolachan grease. Cranberries with grease was called **hlayim ’mii’oot**. Raw whole berries could be kept cool in a bentbox covered with grease, but would spoil if they froze (n.d.:204).

Vaccinium vitis–idaea may also have been called **’mii’oot**. It is not found near Hazelton, but may have been utilized in the northern territories. Lowbush cranberry also can be found in peatlands on the coast.

highbush cranberries **spikst, ts’idipx̱st** *Viburnum edule*

Highbush cranberries are widely available in northwest British Columbia, and keep well. Raw cranberries were formerly stored for winter in boxes with oolachan grease. The berries could be eaten raw; they were also boiled for jam (Smith n.d.: 188).

saskatoons **gam** *Amelanchier alnifolia*

Saskatoons are abundant in the Skeena Valley near the Gitksan villages. They are widely picked and preserved by canning at the present time by both Gitksan and non-Gitksan residents, and are one of the most important berries available to the Gitksan people. They are often canned with rhubarb or lemon juice, to add tartness. Formerly they were eaten raw, or boiled and made into berry cakes (Smith n.d.:113). Dried saskatoon cakes are called **’mii’iyaats’aa** (Mathews n.d.).

hawthorn **snax̱** *Cratageus douglasii*

Hawthorn is eaten with grease. The large seeds are spit out. It is rarely gathered in the present time. Formerly it was boiled in a wooden box and stored for winter; it was not dried in berry cakes, nor mixed with other foods (John Fowler, 9/3/25 and Luke Fowler 5/24/26 in Smith n.d.:109-111).

raspberries **naasik’** *Rubus idaeus*

These are eaten fresh, and in modern times, canned, frozen, and made into jam. Raw (?) raspberries were apparently made into a type of berry cake in the past by being mashed, laid on thimbleberry leaves on a berry rack, and dried in the sun over a smoky fire (Luke Fowler in Smith n.d.:148). Black huckleberries might be mixed with the raspberries in the berry cakes.

salmonberries **’miik̲oox̲s** *Rubus spectabilis*

Salmonberries are uncommon in Gitksan territory, but are abundant on the Coast where many Gitksan formerly worked in the fish canneries. In Gitksan territory, they are found most often in the moist cool montane forests of coastal aspect. Salmonberries were eaten fresh because they are very juicy. They were eaten raw, but not made into berry cakes.

Different names exist for the different colour phases of the salmonberry. According to Jeff Harris Sr. (9/31/87) "The red ones get ripe in the night. The yellow ones **mugu masaak** get ripe in daytime."

thimbleberries **nisk̲'o'o** *Rubus parviflorus*

Children would suck thimbleberries out of a cone made from a thimbleberry leaf (People of Ksan 1980). Thimbleberries were only eaten fresh.

bunchberries **gapk̲'oyp** *Cornus canadensis*

Bunchberies can be eaten fresh. They have a mild sweetish taste and a large seed. Bunchberries were also an important binder or thickener in the berry cakes (Don Ryan 1986; Art Mathews Jr. 1996).

Solomon’s seal berries **k̲'ots** *Smilacina racemosa*

The fruits can be eaten fresh; they are very sweet, and have a relatively large seed. Apparently eating too much at one time can cause diarrhea (Andy Clifton 1988). John Fowler and Bob Robinson (Smith n.d.:77-78) report that the fruit was also boiled, and Robinson suggests that it was sometimes made into berry cakes. Cooked fruit was kept in bentwood boxes for winter storage. The fruit was served by mashing it with oolachan grease. Seeds were spit out. Apparently they do not preserve well by canning (Art Mathews Jr. 9/15/96).

rose hips **k̲'alaamst** *Rosa acicularis*

Rose hips can be made into a jam called **k̲alee'e** (People of Ksan 1980). Rose hips were eaten raw, and were also made into berry cakes mixed with highbush cranberries and red elderberries, according to Luke Fowler (Smith n.d.:91) The rose hip jam was formerly eaten with oolachan grease (John Fowler in Smith n.d.:92).

stonecrop **t'ipyeest** *Sedum divergens*

Stonecrop leaves, "lava berries", are gathered in early May and served fresh with oolachan grease and sugar (Gwen Adams 1987). If they are gathered later, they are quite astringent and make the mouth pucker and teeth feel fuzzy. They were formerly highly valued, although few modern Gitksan have tasted them and know where and how to harvest them. Localities for **t'ipyeest** are found in rocky areas near Gitwingax̲ , Four Mile Canyon, and up the Kispiox River.

wild currant **maa'y welg̲an** *Ribes laxiflorum?*

David Green reported that people ate a wild currant of blue colour. It was made into jam.

wild cherry, pin cherry **snaw** *Prunus pensylvanica*

Pin cherry is moderately common in mixed deciduous growth in the valley bottoms near the villages, especially stands with a history of frequent light burns. According to Smith's informant John Fowler (n.d.:145), pin cherries were eaten raw and boiled for jam. They were not plentiful enough to make into berry cakes. Modern Gitksan do not use pin cherries.

chokecherry **'miits'ook̲, eluuts'ook̲(haluuts'ok̲)** *Prunus virginiana*

Chokecherry is also fairly common in scrubby mixed deciduous stands near the villages. Ripe cherries were eaten raw by children. Chokecherries are not gathered by the Gitksan at the present time.

hazelnuts **sg̲antsak'** *Corylus cornuta*

Although not a berry, hazelnuts are the only edible nut in Northwest British Columbia, and it is convenient to treat them here. Hazel responds well to periodic light burns, and was formerly (and still is) very abundant around village sites. Nuts were formerly gathered and kept for winter use.

Beverage or Tea Plants

The only plant made into tea is Labrador Tea, *Ledum groenlandicum*, locally known as Indian Tea, **sgandax̱doo’o** or **tim laalax̱’u**. It is possible that before the introduction of hot tea by traders, this was only brewed as a medicine.

MEDICINES

A number of plants are used as medicines by the Gitksan. A preliminary treatment of important Gitksan medicinal plants and traditional medicine is found in Gottesfeld and Anderson (1988). Conifer barks and barks or inner barks of other woody plants, especially devil's club, are frequent constituents of medicinal decoctions employed as tonics or to treat illness (Gottesfeld 1992). Juniper boughs, or spruce or pine tips are also added to many medicines. Medicinal roots include yellow pondlily rhizome, cow parsnip root, red elder root, and the toxic and potent rhizome of Indian hellebore (**malgwasxw**).

General medicinal plant knowledge is widespread, but many familial variations exist in the exact proportions and ingredients, length of boiling, dosage and administration of specific herbal preparations. People may be reluctant to share a recipe for medicine outside of the family; in particular, elders have explained that they feel accountable for the results of other people trying their recipe. They would feel responsible for someone failing to be healed, or being injured by improper preparation of a remedy. Another factor which inhibits dissemination of recipes is that people feel that the efficacy of the recipe may be diluted by being shared around, or that the power may be transferred with the knowledge.[14]

Use of medicinal plant preparations forms an important part of Gitksan traditional medicine. Medicinal plant preparations are used as tonics, purgatives and emetics, expectorants and demulcents, wound dressings and antiseptics, poultices, ophthalmic and aural preparations, as skin washes, and as fumigants. Herbal preparations are used to prevent illness and promote health, to treat specific symptoms of disease, for purification, and for protection from witchcraft.

Plant parts may be used fresh or dried, depending on the preparation and availability. Plant parts may be boiled or infused and the resulting liquid taken as "tea" or used an an external wash. Plant parts may be mashed or heated and applied externally as a poultice. Plant parts may also be pounded and mixed with oolachan oil or grease and applied as a salve. Heated pitch may be applied directly to wounds, sores or infected wounds. When used as a fumigant, plant parts may be burned directly on a hot stove, as with devil's club shavings or **malgwasxw** powder, or they may be burned over a low fire. Spiritual treatments involving 'smoking' a victim of evil spirits or witchcraft involve burning the medicinal plants in a sort of 'tent' made by draping blankets over the patient. Medicinal plants can also placed on the rocks in the sweat bath **anguxw 'uutxw**.

Illness is seen as the result of an imbalance in the individual or the environment. Treatment has as its aim the restoration of the disturbed balance, the cleansing of the affected individual. This can be on the spiritual plane, as with **malgwasxw**. There is also a strong emphasis in treatment of disease by purgatives or emetics, which drive out the impurity or illness from the body, leaving the body clean and ready for the return to normal body function.[15] Use of devil's club as a cleanser, and use of emetics like red elderberry root infusion to treat influenza, exemplify the concept that the body must be cleaned out to be healthy and in balance, and by extension, for the person to be lucky (see Chapter 6).

Modern medicinal plant usage is supplemental to treatment by a variety of medical specialists such as physicians, chiropractors, naturopaths or physiotherapists, or councilors. My observations suggest that medicinal plant use often follows family lines or affinal relatives. Grandchildren may collect plants with or for their elder relatives, usually under the instruction of a grandmother or grandfather, who explains how to recognize and collect what is needed. Elders who lack such helpful relatives may complain they cannot make particular medicines, because they have no one to collect the ingredients for them. Herbal preparations may be made by a particularly knowledgeable relative and given to the individual, or parent of the individual, needing care. These may be of the patient's own clan, or perhaps affinal relatives like a mother-in-law.

amgiikw, giikw western hemlock *Tsuga heterophylla*

Hemlock inner bark can be used as an ingredient in wood medicine decoctions. The Gitanyow Summer Student Research Program (Campbell *et al*. 1984:7) mentions a mixture of subalpine fir, spruce and hemlock bark for TB and loss of appetite. Hemlock needles can also be brewed for tea (Mathews n.d.). Whether this is medicinal or simply a beverage is not stated.

Hemlock 'cambium' (**xsuu'w**) was swallowed when a sharp object had been inadvertently swallowed. The hemlock 'cambium' was believed to wrap itself around the foreign object and help the body pass it safely (Peter

Martin 1988.) Eating hemlock ‘cambium’ is also supposed to be good for the gall bladder (David Green 1987.)

amk̲oox̲s aspen, "poplar" *Populus tremuloides*

Aspen bark forms an ingredient of a medicinal mixture used for internal cleansing (Sophia Mowatt 11/87). Aspen ‘cambium’ can be chewed or sucked in springtime as a stimulant (Mathews n.d.) Luke Fowler told Smith in 1926 that aspen root bark could be chewed or mashed and put in cuts. A decoction of the bark, boiled alone, was effective as a purgative (Smith n.d.:159).

belana 'watsx̲ running clubmoss and other clubmosses *Lycopodium clavatum, L. annotinum* and others

According to Art Mathews (n.d.) clubmoss (presumably the spores) could be used for stopping bleeding of wounds and nosebleed, for diaper rash, and was used "by the shamans to dramatize his healing powers by putting the powder in the fire to create a firework like effect, because the spore powder is very flammable."

g̲ahldaats yellow pond lily *Nuphar polysepalum* Engelm.

Yellow pond lily is a rooted aquatic growing in small ponds and shallow lakes and marshes in one to two meters of water. The leaves emerge in early May and senesce in the Fall. The thick rootstock overwinters, rooted in the muddy pond bottom. The rhizome is the portion of the plant used. It is laborious to dig, and according to one elder should be dug in May, or after flowering, in the fall. Other people do not feel that the time of gathering during the growing season is significant. Gloria Wesley (11/87) described attaching a blade to a stick to cut the roots off the rhizome so it can be removed. The cortex and adhering leaf bases are peeled off of the fresh rhizome and it is sliced about 1/2" (1.25 cm) thick. The slices are strung on a stick and dried. They are stored that way until needed or powdered when dry and stored in sealed glass jars. Powdered root can be steeped in boiling water for use. It is necessary to boil the root slices to use them.

The sliced rootstock of yellow pond lily is used as a poultice for arthritic joints and skin ulcers and fractures. The pieces of rootstock are warmed and then applied to the area to be treated. A decoction of the fresh rootstock is used as an appetite stimulant for weak and sickly persons such as tuberculosis patients. "It's just like iron", one elder commented. An infusion of the powdered dried rootstock is also reported to be useful for cancer and stomach complaints or ulcers. It "cleans the lungs and the insides." The Gitanyow Summer Students (Campbell *et al.* 1984:9) report that yellow pond lily could be used for any internal ailments, including urinary problems, diabetes, TB, gallbladder problems, or kidney disease. Tuberculosis remedies were made by boiling together **gahldaats**, with devil's club inner bark and balsam bark, or by **gahldaats** alone. Several people have reported being treated for tuberculosis with such remedies when they were children and eventually becoming cured. Smith also mentions that 'scrapings of the toasted "root" of the Water Lily were put in water and the infusion was drunk for hemorrhage of the lungs' (Smith n.d.:104).

It may also have been employed for birth control in the past (H. Smith 1926:104; Don Ryan 1986). One person reported that too much will "make a man sterile".

Powdered dried rootstock can also be added to warmed spruce pitch and used as a hot plaster.

giist "mountain alder" (*Alnus crispa*)

Giist or "mountain alder" is distinguished from **amluux** "red alder" by its prominent white lenticels on the stem bark or by gray bark in contrast to other alders, by its frequently curved stem bases, by its smaller size, and by its habitat "on the mountains". Its leaves may have a sugary exudate on the underside in the summer (Art Mathews Jr.)

Giist is used for several things. Some medicinal decoctions involve **giist** bark (see Devil's club) , and salves may require the immature female catkins or the stem bark as an ingredient (see pine).

Harlan Smith (n.d.:167) also reports medicinal uses of the female catkins, and names for female and male catkins (**meega giist**). The pistillate catkins were variously used as a "physic" or for gonorrhoea medicine along with shavings [of bark or wood?]. The gonorrhoea medicine was said by Smith to be a diuretic. Smith's consultants also mentioned a decoction of bark and roots of mountain alder used for cough medication.

gwul litxwit large leaved avens *Geum macrophyllum*

Large leaved avens is distinctive in retaining the green colour of its leaves throughout the winter, a fact alluded to in its name, which means 'evergreen.' This plant is not widely known at present, but Olive Ryan recalled that her Grandmother Fanny Johnson (Ha'namuxw) of Andimaul used it for sores (9/10/96).

ha'ums, wa'umst devil's club *Oplopanax horridum* (Smith) Miq.

Devil's club is a sprawling deciduous shrub in the Ginseng family, of one to five meters in height, which grows in moist coniferous and mixed forests and in avalanche tracks. It is common in northwest British Columbia. Devil's club stems can be gathered after the leaves senesce or when the plant is dormant, but not after the leaves have begun to open. It is frequently gathered in October or early November after the first snowfall, or again in the early spring, when the daytime temperatures are above freezing. Other medicinal barks which are often used with devils club, such as spruce or subalpine fir bark, are also gathered at these times of year (Fig. 4-7).

The leafless spiny stems of the devil's club are the part used by the Gitksan. For most uses the inner bark layer is scraped off of the stems. The shavings of inner bark can be dried and stored as "chips". Some people also powder the dried inner bark, either by roasting the stems in an oven before scraping them, or by powdering dried chips. These can be taken in gelatin capsules, or added as a powder to a liquid such as orange juice. Fresh devil's club inner bark can be used to prepare an infusion or decoction, either alone, or in mixed 'wood medicine' (**x̲haldawk̲xum gan**) decoctions. Fresh bark can also be chewed, as in the arthritis remedy mentioned below, or used as wound dressing (Campbell *et al.* 1984; Wilson *et al.* n.d.). The pliable fresh bark strips can also be formed into "pills" for later chewing, as in some pre-hunting or trapping **sisatxw** rituals.

Recipes used by some elders make decoctions with chunks of fresh, unpeeled devil's club stems rather than peeled inner bark.

The inner bark of devil's club is used fresh or dried for rheumatism, respiratory ailments, as a general tonic, for stomach ulcers and stomach pain, and for gynecologic cancers (Gottesfeld and Anderson 1988). Regular chewing of fresh devil's club inner bark is believed to maintain good health;

good health and vigour among older people has been attributed to its regular use. Regular chewing of (preferably fresh) devil's club bark is reported to be helpful in treating rheumatism or stiffness of the joints.

An infusion of fresh devil's club bark is a tonic and "energizer". It tastes "like grapefruit juice." An infusion of dried devil's club bark is used to treat stomach pain and ulcers. Devil's club tea was also used in conjunction with fasting in purification rituals, and as preparation for gathering of **malgwasxw**.

Devil's club is widely used by hunters and trappers, both for purification and enhancement of luck, and for keeping 'clean.'[16] Chewing devil's club and bathing in devil's club decoctions has a very important role in **sisatxw**, the ritual purification to obtain"luck" or success in hunting, trapping and other endeavours. Bathing with devil's club solution can remove evil influences, while burning devil's club bark in the building is also believed to cleanse a house.

Devil's club is also an ingredient of a number of herbal mixtures (Wilson *et al.* n.d., Gottesfeld and Anderson 1988). Beverley Anderson and I have collected recipes for tonics which employ devil's club in combination with juniper boughs, alder bark (*Alnus incana*), wild calla stems (*Calla palustris*), subalpine fir bark (*Abies lasiocarpa*), mountain ash bark (*Sorbus scopulina* and *S. sitchensis*), highbush cranberry twigs (*Viburnum edule*), and spruce bark (*Picea* x *lutzii*). These decoctions are used as tonics, to prevent or treat influenza, respiratory ailments or tuberculosis, and to achieve spiritual well-being (Gottesfeld and Anderson 1988).

A list of herbal ingredients for several mixtures follows. Recipes, preparation techniques and dosage are not included because proper instruction in preparation and use of the medicine is necessary. The recipes are the property of the people who shared them.

Mixture 1
for T.B. and tonic
    Devil's club inner bark
    Juniper boughs
    subalpine fir bark
    spruce bark

mountain ash twigs or bark

The spruce bark helps to sweeten the mixture and improve the taste.

Mixture 2
for prevention of colds and flu
devil's club stems
juniper boughs
spruce bark

Mixture 3
treatment of colds; tonic?
devils club inner bark
balsam bark
spruce bark
juniper boughs

ha'mook̲ cow parsnip *Heracleum lanatum*

The root of cow parsnip is an ingredient of a spiritual remedy for soul loss caused by bewitchment by an evil witchdoctor (**haldawgit**, "sorcerer"). The effect is to turn the evil magic back on its perpetrator. The medicine is burned as a smudge in the room where the affected person is.

Cow parsnip roots were also used as a poultice for rheumatic swellings (as they are among the Wet'suwet'en); and other swellings and boils (Smith n.d.:168). Robert Jackson said that they were pounded and placed on the sore area and heated (1994).

hisgahldaatsxw wild calla *Calla palustris* L.

Calla palustris grows in swampy areas and the shallow margins of ponds in wet mucky soil or up to 0.5 meter of water. In the Skeena Valley, it does not occur west of Seeley Lake, just west of Hazelton. The prostrate creeping stem and buds of wild calla are gathered in the early spring after the ice is gone but before it leaf expansion.

The entire plant contains irritating saponin-like substances and oxalic acid crystals which are rendered harmless by prolonged boiling (Hultén

1968, Kingsbury 1964). The preparation of wild calla for medicine involves boiling the fresh rhizomes for six hours. Ingestion of medicine which has not been cooked long enough will cause throat irritation. Ingestion of raw calla will cause severe irritation of the oral cavity and throat, swelling and difficulty in swallowing (Eric McPherson, personal communication 1986).

David Green calls wild calla **hisgahldaatsxw**, which means 'resembling **gahldaats**', the yellow pond lily. David uses this plant as a part of a mixture employed as a spiritual spring tonic (see devil's club).

Wild calla was reported as a medicinal plant used by the Gitksan by Harlan Smith (n.d.:73), although Compton (Compton *et al.* in press) feels that the name reported, "shien", may in fact be the Tsimshian term for silverweed (*Potentilla anserina*). If Smith has mistaken the identity of the plant, the uses reported by his informant, Luke Fowler, including use of a decoction of calla for cleaning the eyes of the blind, for hemorrhage of lungs or mouth, for short breath and for treatment of influenza, would actually apply to *Potentilla* rather than *Calla palustris*. Smith's report that the root tasted like "banana" suggests a mistake in identification might have been made (see comments above about toxicity of *Calla*).

hoo'oxs subalpine fir *Abies lasiocarpa*

The liquid pitch of subalpine fir bark blisters is particularly valued. Its Gitksan name, **xsduu'whl hoo'oxs**, translates as 'the tears of the balsam [subalpine fir]'. A term for the pitch blisters, **'moot'ixsa hoo'oxs**, means 'the teats of the balsam [subalpine fir]'. The liquid pitch is used as a wound dressing and also in liquid medicines for respiratory problems. One recipe mixes subalpine fir pitch with rendered hoary marmot grease. This is taken internally "for cleaning the insides out"(David Green 1987). Liquid pitch from the pitch blisters can also be mixed with oolachan grease. This medicine is reputedly a strong purgative and emetic, but also was reported to have helped an individual's arthritis (Mary Johnson 8/2/95). It is difficult to obtain in the winter or early spring, but is plentiful once the growing season has begun.

Subalpine fir bark forms an ingredient of a spring tonic mixture and is used in other **x̱haldawḵxum gan** medicinal mixtures also, such as with devil's club, pine bark, spruce bark, juniper boughs, or yellow pond lily and others.

Smith reports that eating the 'cambium' in June was a remedy for constipation. The "gum" of the bark blisters was taken internally as a purgative and diuretic for tuberculosis and gonorrhoea. Pitch could be applied as a dressing for cuts and sores, including those of gonorrhoea. The young cones (which are covered in pitch) could also be sliced and mashed and used like the pitch of the bark blisters (n.d.:66-67).

is soapberries *Shepherdia canadensis* (L.) Nutt.

Soapberry is present over a wide elevation range from low elevations to montane sites except in the immediate coastal area.

Soapberries are reported to help arthritis (Art Matthews Sr. 1987). Art used green berries for this; Art said he learned this use from "the Coast People" (Tsimshian.) Wilson *et al.* (n.d.) also report use of soapberries for arthritis. Other medicinal uses are for heart attack and indigestion (Mathews n.d.)

An infusion of the dried leaves is used for a diuretic and to treat bladder and uterine infections. Dried leaves are steeped in about one gallon of water "to make a light tea" for these uses. The leaves are gathered for medicine after the berries are finished. The Gitanyow summer students (Campbell *et al.* 1984:16) also report use of soapberry leaf tea for digestive problems and boils. The berries are reported to speed childbirth and act as a uterine stimulant.

Smith reports several medicinal uses of soapberry. Bob Robinson described use of a decoction of the whole plant, roots, branches and leaves, for treatment of chronic cough (Smith n.d.: 154) . John Fowler (Smith n.d.:121, 152-54) described a medicine for rheumatism made from soapberry root; this involved boiling the whole roots with spruce twigs with needles and bark on them. Luke Fowler (Smith n.d.:153) apparently advocated a decoction of the whole plant, including the roots for "fire" sickness (fever?), not for rheumatism.

k̲'ots, sgank̲'ots false Solomon's Seal *Smilacina racemosa*

Smith's consultants mention two medicinal uses of the roots of Solomon's seal: as a "very strong" medicine for rheumatism, and "for cuts" (Smith n.d.: 77-78). Recently, David Green mentioned in passing that the roots of **k̲'ots** could be used for "medicine" (transcript, 7/24/95).

lax̲sa lax̲nok̲ 'boughs of the supernatural', **sgannax̲nok̲** 'supernatural plant, common juniper *Juniperus communis*, especially the low growing ecotype which grows on rocky ridges, and ?low growing Rocky Mountain juniper *Juniperus scopulorum*

Juniper boughs are used in a number of medicinal decoctions, often in mixtures which include devil's club and other ingredients (see devil's club). Juniper boughs can be also be burned as a fumigant to purify a dwelling. Harlan Smith (n.d.) reports use of a decoction of the whole plant of juniper for hemorrhage of the mouth and for kidney trouble. It was reported to be a purgative and diuretic, and "to make one strong" (Luke Fowler, in Harlan Smith n.d.:57).

The name, **lax̲sa lax̲nok̲**, translates as 'boughs of the supernatural'. The name given to juniper indicates the power attributed to the plant. Some informants restrict this name to a specific ecotype of juniper growing in rocky places in the mountains, calling low elevation plants **t'sex̲** (Walter Wilson, Abel Brown October 1986), while others call all common juniper **lax̲sa lax̲nok̲** (Elsie Morrison). Juniper is also referred to as **sgannax̲nok̲** which means 'supernatural plant'.

malgwasxw, **melgwasxw** (rootstock), **sganjiks** (whole plant) Indian hellebore *Veratrum viride*

Indian hellebore is a large perennial herb in the lily family found, in Gitksan territory, chiefly in moist montane and subalpine meadows. Clumps can reach up to about 1.8 m in height, with three or five separate stems, and regrow from the rootstock every year. The root of this plant is dug when the leaves are dormant. It is considered a very powerful and spiritual plant. Gitksan people recognize its toxicity (see Kingsbury 1964, Jeger and Prelog 1960, and Chapter 7), and do not use Indian hellebore root for preparations which are taken internally.

Malgwasxw appears to differ from "ordinary" medicinal herbs in that it has high spiritual value. Like devil's club, it is an herb of purification as well as healing. The proper state of mind is required to gather and use it. The gatherer should purify him or herself before gathering **malgwasxw** by fasting, bathing in cold water, and use of devil's club tea. When gathering the root, the gatherer should chose a plant that will help; ask the plant for help and to forgive him or her for taking it. He or she should pray to the Creator and give thanks for the gift (Fred Johnson 1985). Many people say that the **malgwasxw** will loose its spiritual power if it touches metal, and state that the roots should be dug up with a sharpened pole of **giist**, "mountain alder". Others loosen the dirt with a tool like a mattock, but then use a stick to actually lift the rhizome pieces out of the earth.

Two main types of use are made of hellebore root, as an external medication for skin and hair conditions, and as a spiritual cleanser, protector, and bringer of luck. Powdered dried rootstock is used to bath the skin for treatment of itches. It is used to clean hair also (Wilson *et al.* n.d.), and may be toxic to external parasites like lice. The other main use is spiritual, for counteracting evil spirits and bringing good luck. One can use an external wash with a solution of powdered rootstock for these purposes as well. A ritual which includes washing with a solution of **malgwasxw** is remedy for persistent nightmares. In addition, a piece of root or powdered rootstock can be used as a fumigant in the house to drive away evil spirits or "kill germs". **Malgwasxw** could be burned on the rocks in the sweat house, **anguxw'uutxw**. Modern Gitksan may mix **malgwasxw** with other spiritually powerful herbs such as juniper or sage for a cleansing smudge. Inhaling the smoke of **malgwasxw** has a calming effect. Smith (n.d.:74) reports that inhaling the smoke was used in treating "bad dreams, flu, and rheumatism." Laundry can also be cleansed by addition of powdered hellebore root; this use may combine toxicity to vermin and spiritual cleansing.

Accidental inhalation of the powdered rhizome causes violent sneezing. Some elders consider this effect beneficial, though others do not. Other groups like the Coast Tsimshian (MacGregor 1981) and the Fraser Lake Carrier (personal observation) use it as a snuff to clean the sinuses.

Smith reports that one could sit or lie on the leaves when taking a sweat bath for rheumatism, or place the leaves over the "lame places." He also gives a recipe for a mixed poultice made from **malgwasxw** (ground fresh? or powder?), **damtx** (inedible fern rhizome), subalpine fir bark, devil's club inner bark, and spruce or pine pitch, which was applied topically to boils or ulcers, or placed on the chest for hemorrhage of the lungs (n.d.:74). The Wet'suwet'en also mentioned the use of *Veratrum viride* rhizome for poulticing arthritic joints (Gottesfeld 1994). Bruce Rigsby (personal communication 1997) comments that **malgwasxw** was also used for moxabustion, and that elderly people used to have scars on the backs of their hands from burning it there.

Smoke treatments were used for various spiritual illnesses. A condition called **godalol'x**, which may have been stroke, was treated by smoking the victim with a smudge of **malgwasxw**. The method involved covering a patient on a bed with a blanket and "smoking" the person by burning **malgwasxw** under the bed. This treatment is called **megulk̲s**. After treatment, the person ‘goes back to normal,’ according to Peter Martin (1988). If this treatment failed, then six or eight **haalayt** were called in to work on the patient. Elders have also suggested that **megulk̲s** might be effective in curing alcoholism and substance abuse.

The smoke of **malgwasxw** has also been used to assist the spirit of a sleepwalker in returning to the body properly. To do this a piece of burning rootstock was placed under the nose of the sleepwalker so that they would inhale some of the smoke.

A piece of the rootstock is frequently carried for a luck amulet or for protection. It is believed to enhance luck and resist the contaminating and unlucky influence of witchcraft or ghosts.

Not everyone should gather **malgwasx**, and a given piece of rootstock should not be handled or looked at by many people, or it will lose its potency. **Malgwasxw** is highly valued, and should not be left untended. To maintain the spiritual potency of Indian hellebore, the plant must be gathered in the correct manner and treated with respect. Failure to do this is believed to nullify the good power of the plant, and may cause harm to the user.

Harlan Smith reports (n.d.:74) that ‘medicine men’ could not inhale the smoke **malgwasxw** because it would kill them by destroying their magic. He likely is referring here to evil sorcerers or ‘witches’, **haldawgit**, who derive their power from secret rites involving corpses and excrement, as the power of a **halayt** (shaman) would not be destroyed by **malgwasxw**. The repellent effect of **malgwasxw** smoke on suspected ‘witches’ is confirmed in modern anecdotes.

maa’ytwhl smex ‘bear’s berries’, orange fruited shade form (?wild sarsaparilla, *Aralia nudicaulis* or possibly baneberry *Actaea rubra*)

The root is used to make a medicine that heals wounds made "when they open the skin" and put "pitch" if it does not heal right away. It is pounded and mixed with pitch and applied topically.

mihlxw; diiuxw cinder conk *Inonotus obliquus* and birch conk *Fomes fomentarius*

Cinder conk is a black crust-like polypore used as tinder and for moxabustion treatment of arthritis (Gottesfeld 1992b). After slivers of the cinder conk are burned to the skin on the affected area, salve (see pine) is applied to the wounds. Plain pine pitch can also be applied to the sores. Birch conk can also be used for moxabustion (Olive Ryan 1994).

seek̲s spruce; tips *Picea* x *lutzii*

Spruce tips, the young needles and twig at the ends of branches, have several uses. They can be pounded with pine tips and other ingredients to form a salve (see pine). Smith mentions a decoction of spruce twigs (with needles and bark) and soapberry (n.d.:121) (see soapberry.)

Maasa seek̲s spruce bark is used with balsam bark, devils club and other ingredients in **x̲haldawk̲xum gan** 'wood medicine'. These bark strips contain a lot of pitch and also contain tannins. Typically, a bark strip of a given dimension will be specified in a recipe. The fresh bark will then be chopped into pieces and boiled or steeped alone or as part of a mixture to release its medicinal properties. Spruce bark is used in an anti-tubercular tonic.

Another use for spruce bark is as a treatment for serious burns. The whole spruce bark (**'ootx**) is roasted and pounded to a powder, then sprinkled over the burned area and covered with a dressing (Neil Sterritt Sr.).

The uses of spruce pitch, **sgena seek̲s**, are described below under pitch.

sgen pitch

Pitch from lodgepole pine, subalpine fir and white or englemann spruce and their hybrids is called **sgen**. These kinds of pitch are all valued as wound dressings and antiseptics. Different qualities and grades of pitch are recognized. Pitch from the different tree species is used similarly, but people will usually specify in a recipe which pitch is to be used. Pitch is also used in medicinal mixtures (see pine). Spruce pitch (from *Picea engelmannii* and *P. glauca* and hybrid populations) is used for wound dressings. Pitch from black spruce was used for chewing gum. Spruce pitch may also be mixed with powdered dried yellow pond lily rhizome and applied as a hot plaster.

sginist lodgepole pine *Pinus contorta*

Pine pitch **sgena sginist** is a valued wound dressing and is used to draw the infection from boils; it is also reported to be effective against burns.

Pine tips are mashed with spruce tips, alder bark or cones and grease as a salve which is part of a moxabustion treatment for arthritis. Pine tips can also be made into tea and given for tuberculosis (Campbell *et al.* 1984). Pine bark can be an ingredient in **x̲haldawk̲xum g̲an**. Pitchy pine wood may be boiled and the decoction used as a medicine. Smith's consultants mentioned use of pine tips and "resinous shavings" as a purgative and diuretic. A decoction of the pitchy wood was "put in oil and drunk as a purgative and diuretic for many bad ailments" including gonorrhea and tuberculosis (n.d.:65).

sg̲anloots', wishl loots' red elderberry *Sambucus racemosa*

The bark of the red elderberry and its roots are used for medicine. The root bark of red elderberry was used as a purgative and emetic as a treatment in serious illness (David Green 1987; Bertha Starr 1987). It was reported to have been used as a treatment during the 1918 flu epidemic. To prepare the emetic, the inner bark of the root is scraped off, as in the preparation of devil's club. A small quantity of the bark shavings are then added to boiling water and set to steep. The resulting milky fluid is drunk lukewarm, followed by lukewarm water. After the patient vomits, a cup of lukewarm water is given. This is repeated until vomiting ceases, when the patient is believed to be completely 'cleaned out' (David Green 1987). Weakness, general illness and inability to eat were presenting symptoms for the use of the emetic preparation. Such treatment was followed by giving fishhead broth or some other nourishing liquid. Harlan Smith (n.d.:186-187) also reports use of red elder roots as an emetic and purgative in the 1920's. Another reported use of elder bark is for tuberculosis. It can also be administered as a smudge as part of a medicine to cure a victim of evil witchcraft.

sganmaa'yhl gaak̲ black twinberry, 'crowberry' *Lonicera involucrata*
The berries or an infusion of the inner bark of the black twinberry can be used for eye medicine. (David Green 1987; Smith n.d.:183, 184)

sgansa angitl' mountain ash *Sorbus scopulina* and *S. sitchensis*
The bark or twigs of mountain ash can be used an ingredient of **x̲haldawk̲xum gan** (see devil's club recipes) (Pete Muldoe 1987). Taking the fresh berries as a "physic" was the only medicinal use reported by Smith (n.d.:112).

sgants'idipx̲st highbush cranberry *Viburnum edule*
Twigs of highbush cranberry can be boiled with devil's club and other ingredients such as juniper boughs and balsam bark. They are gathered in early spring, before they bloom. John Fowler told Harlan Smith in 1926 that bark and twigs were boiled for cough (n.d.:188).

snaw wild or pin cherry *Prunus pensylvanica*
Pin cherry bark is scraped off the stems and mixed with other ingredients to make a decoction used for treatment of coughs. Smith's consultants (n.d.) did not report medicinal uses for cherry bark.

x̲aadax̲ unknown
This plant was powdered and used as wound dressing, and in at least one mixed medicinal decoction. It also used for hunting medicine. A herb of the same name is given by Jenness (1943) as the Wet'suwet'en 'wolverine' hunting medicine. In this story, wolverine is forced to reveal **x̲aadax̲** as the source of his hunting prowess. The Gitksan have the same story about wolverine and his hunting success, suggesting that the same plant is likely used as hunting medicine by those possessing this story. It is said to grow "up the mountain". A locality up Cedar Creek near Gisgaga'as was mentioned by David Green. Although it is said to resemble *Lycopodium annotinum* or *Huperzia selago*, its botanical identity remains unknown.[17]. Cove and MacDonald (1987:79-81) also give a version of the

wolverine story; the medicinal plant used by wolverine in their version is translated as "fern root."

x̲hlaahl red osier dogwood "red willow" *Cornus stolonifera*

Red osier dogwood roots **wishl x̲hlaahl** are used as a poultice for sore joints and broken bones. They are strong (efficacious) in the summer, and also are good in the fall. They are easily dug. The roots are pounded and applied as a poultice (Walter Wilson 1987). The inner bark is boiled and used as an analgesic poultice, or applied to sores (Mathews n.d.).

x̲sneenauntwxt (in part) yarrow *Anaphalis margaritacea*

Yarrow is ground and mixed with bear fat for hair ointment (Olive Ryan 7/12/95). A decoction of yarrow is good for the heart. It is taken unmixed, as a tea. It can also be used for a wound dressing. It was used in the Kitwanga Fortress (Ta'awdzep) (Andy Clifton 6/12/91).

Luke Fowler said that the whole young plants from June to mid-July (except the roots) could be boiled and the decoction gargled for a sore throat. In winter, the roots could apparently be harvested for use; they could be located by the dead stalks (Smith n.d.: 194).

[Gitksan name not recalled] heart-leaved Arnica, "sunflower" *Arnica cordifolia*

Heart-leaved arnica leaves can be ground up and mixed with pitch as a plaster for sores (Olive Ryan 9/10/96.)

Medicines Recorded by Harlan Smith Which Have Not Been Recorded in Recent Fieldwork

ha'mook̲ g̲anaaw "frog parsnip" (in part) angelica *Angelica genuflexa*

Smith reports that angelica roots were boiled with highbush cranberry twigs, and the decoction drunk for headache and weak eyes (from Luke Fowler; :172)

ha'mook̲ g̲anaaw "frog parsnip" (in part) meadow rue *Thalictrum occidentale*

A second plant called "frog parsnip" was also used for medicine. Smith reports that the root of meadow rue was used for headache, eye trouble and sore legs. A small piece of the root was chewed, and a little bit of the juice was swallowed. It reportedly cleaned the throat and possibly promoted blood circulation (Smith n.d.:107, from Luke Fowler).

ihlee'em ts'ak̲ bleeding nose (in part) *Castilleja miniata*

Luke Fowler told Smith that the whole plant could be boiled and the decoction drunk for "nose bleed, bleeding, stiff lungs, bad eyes and lame back." Smith thought "lame back" might be a symptom of kidney trouble. He also indicates that Indian paintbrush "is purgative and diuretic". Abraham Fowler said the seeds could be boiled and the decoction drunk for cough (Smith n.d.:181).

lam anemone *Anemone multifida*

Luke Fowler told Smith that "handsful of this plant were eaten in the sweatbath when it was employed for curing rheumatism. A decoction of the plant was sometimes used for the same purpose. It burns the tongue..." (Smith n.d.:106.) In a recent compilation of plant terms for the Gitksan Dictionary, Art Mathews Jr. also reports use of **lam** "the roots are considered to have powerful healing properties on treating open wounds" (Mathews n.d.).

milkst wild crabapple *Malus fusca*

Luke Fowler (Smith n.d.:111) mentioned several medicinal uses of crabapple bark. The moist inner bark or sap could be put into the eyes for eye medicine. Branches and stems, or bark scrapings, could be made into a decoction for rheumatism or cough. It apparently also served as a tonic, and was a "physic and diuretic".

TECHNOLOGY

European visitors to the Northwest Coast were impressed with the sophistication of Northwest Coast woodworking. Even with very rare use of metal tools, Northwest Coast peoples made large plank halls, and large oceangoing cedar dugout canoes, using ground and polished jade adzes and beaver tooth chisels for carving, aided by use of fire and steaming to finish shaping. In the historic period, Native canoes plied the coast from at least Southeast Alaska to the Columbia River, and people from the Skeena River regularly travelled by canoe to Victoria in the 1860's to trade.

Smaller wooden implements included paddles, soapberry spoons, and boxes and chests, and feast headdresses and masks. Indigenous implements such as snowshoes (**simnax̱**) or Chiefs' feast headdresses (**amhalayt**), combining plant and animal materials, were also common.

Tree barks and roots were also widely employed for basketry, cordage, and clothing. The Northwest Coast peoples made textiles, of both vegetable and animal origin, by twining. In addition, in the interior, true weaving was used to make rabbitskin blankets, and, at least since the mid-19th century, packstraps or tumplines were woven on wooden slat rigid heddle looms.[18] Mats and some types of utilitarian cedarbark baskets were made by off-loom weaving.

Birchbark, with its unique peeling and waterproof properties, was used both for food storage and for torches. Firewood too, for both warmth and light, as well as for cooking, can be considered a 'technological' use.

Moss or boughs were used for bedding, and moss was used for diapering and menstrual needs. Clean fern fronds or leafy branches covered the ground and kept fish clean during preparation for the smokehouse[19] .

Although animal materials were widely used for clothing and bedding, as well as ceremonial regalia, and babiche [stretched rawhide lacing] was vital for snowshoe filling, plant materials played a preeminent role in Gitksan technology. Plants provided shelter, transportation, some clothing, ceremonial artwork and regalia, sanitary materials, mats and furnishings, containers and utensils, fuel, tinder and light.

cedar **simgan** *Thuja plicata*

Cedar wood was used for innumerable things by the Gitksan as by other peoples of the Northwest Coast. Cedar poles were used for the frames and rafters of longhouses and smoke houses, and carved into memorial poles and statues. Before the introduction of iron blades, adzes with blades of nephrite or beaver teeth were used to shape cedar (Figure 4-8), and mauls of nephrite were used with wedges for splitting the wood. Heavy split cedar planks were used for the walls of houses. Lighter cedar planks were steamed and bent to form bentwood boxes **gal'ink̲** used for storage, carrying, and cooking (Figure 4-9). Heavier, lidded ornamental bentwood boxes are called **x̲ts'ayap**. Cedar was also bent to form cradles for children. The straight grain, easy splitting quality and large size of cedar made it available for these uses before the introduction of iron and steel tools. Its name, "true or real wood," (**simg̲an**) indicates its great importance. In addition, cedar slats were used for fish weirs, berry racks and tumpline looms.[20]

Whole cedar bark was used for roofing. Its durability and waterproofness as well as its relatively low flammability suited it to this purpose (Figure 4-10).

Cedar inner bark **amhat'a'l** was used as extensively as cedar wood. Cedar bark is stripped from trees in the spring when the sap is rising and the bark slips easily off the wood. (Figure 4-11 a,b) A horizontal cut through the bark to the wood is first made near the base of the tree. The bark is pried up, and then pulled upward as high as possible, resulting in a very long, narrow triangular piece of bark. The outer bark is removed from the flexible inner bark, which is folded into bundles for storage.

Cedar bark must be soaked overnight to regain its flexibility before being used for tying or weaving. The inner bark is split to the thickness and width desired for use. Cedar bark was woven into baskets, mats and hats. Cedar baskets were made in a number of sizes and shapes (LaForet 1984). Many Skeena baskets were made large and flexible so they could be folded for storage when empty. These appear to have been rather like large shopping bags in shape. There has been a modest revival of cedarbark basketry in recent times, with small baskets being made for handicrafts or gifts. Cedar basketry is no longer made for household use by the Gitksan. Modern baskets I have seen are not of the large flexible type which were formerly common, but are smaller, rigid woven or twined containers.

Cedar mats were the household furnishings of the Gitksan. Cedarbark mats were also used for traditional harvest of red soapberries (see soapberries). Cedarbark was dyed black by soaking it in special clay for one day. The right kind of clay was found only in particular places. One site for clay collection was near where the lumber mill is in Gitwingax̱ (Olive Ryan 7/25/95). Another locality is near Glen Vowell (Mary Johnson, Proceedings at Trial, No. 0843, Smithers Registry (transcript) v. 13:790-791). As mentioned under red alder, cedar bark could also be dyed a dark red colour by being soaked in a solution of alder bark. Use of black and red strands of cedarbark in mat making made woven patterns possible. Special mats were put down over the earthen floor of the longhouse when visitors were expected.

Cedarbark could be pounded until the fibres separated. This pounded cedarbark was spun into thread or cord, and plied to make rope. Spun cedarbark was twined into capes and dresses or skirts that formed the main clothing of the Gitksan. Cedarbark thread was used to give strength to the mountain goat wool warp strands of the famous dancing or "Chilkat" blankets (**gwishalayt**); mountain goat wool lacks the crimp and length of fibre which makes sheep's wool suitable for spinning into fine strong yarn.

Cedar withes (flexible branches) formed tough durable cordage. Withes were twisted until they became flexible and were used for lashing where great strength was critical as in suspension bridges and fish traps (Figures 4-12 and 4-13).

yellow cedar **'wihl** *Chamaecyparis nootkatensis*

Yellow cedar is a dense, hard, aromatic wood which can be split along the grain. It was used especially for canoe paddles **waax**. It only grows out on the Coast, so would have to be obtained when travelling or by trade.

spruce **seeḵs** *Picea* x *lutzii*

Spruce logs or poles were used for construction of longhouses **huwilp**, cabins and caches (Anonymous 1979:10). Poles could be used either vertically or horizontally to form walls, and were used for the pole frames and rafters.

hemlock **giikw, amgiikw** *Tsuga heterophylla*

Hemlock boughs are used for bedding when camping. The wood is used for carving dishes, spoons and pots (Mathews n.d.). On the coast, hemlock boughs are used to collect herring spawn, a spring delicacy.

cottonwood, black cottonwood **am'mal, am'mel** *Populus balsamifera* ssp. *trichocarpa*

Cottonwood is the largest deciduous tree in Gitksan territory, forming towering floodplain forests along the major rivers. Its name ("good for canoe") indicates its most important use: the construction of dugout canoes. These were the principal form of summer travel along the rivers until the arrival of steamships and the construction of railroad and wagon trails. Several elders now living remember watching their grandfathers carving canoes when they were small children (Solomon Marsden 1989, Olive Ryan 1996.) (Figure 4-14) The tree was felled and shaped with fire and adze. When the canoe was carved to the desired shape and thickness, it was filled with water and hot rocks added to make the hull pliable. It was then spread by the insertion of thwarts so that it was widest in the middle and tapered to bow and stern. A few small surviving canoes can still be seen, particularly at Ksan in Hazelton, but they are no longer usable (Figure 4-15).

Cottonwood is also excellent wood for smoking salmon in the smokehouse, because it lacks resin and has a mild taste.

The ash from cottonwood can be used to make a bleach solution (Mathews n.d.).

maple **k̲'oox̲st** *Acer glabrum* var. *douglasii*

Maple trees are not abundant and do not grow to large size in the Skeena country, but the quality of their wood and bark made them important in aboriginal technology. Maple wood is hard and durable, wearing well and bending well. This made it the ideal wood for snowshoes **simnax̲**.

Gitksan snowshoes are long and narrow, with sharply upturned rounded toes (Figure 4-16a). They are made from the basal four and a half or five feet (1.4-1.5m) of a maple. Maple growing on sand was said by the late Charlie Turley of Gitwingax̲ to be too soft. Percy Sterritt of Kispiox Village prefers maple from areas downriver; maple from Kispiox Valley in his experience is more brittle and harder to bend well. Depending on the size of the maple, two to four sticks can be cut from one tree. These will form one or two snowshoes. If two sticks are cut from one tree, they are used as the two sides of one snowshoe to maximize consistency of bending behaviour of the wood, so the shoe will be as symmetrical as possible. The sticks are shaped, but the wood just under the bark is strongest. Therefore, they are not flattened, but the bark is simply removed. The resulting rounded surface forms the outer sides of the snowshoe frame. The toe, which is thinnest, and takes the most stress, is made from the bottom of the tree, which is the toughest. The side pieces of the snowshoe are bent by boiling them in water until they are pliable, which could be for a period of up to two days (Bert Emery 5/12/91). Bert made a jig for Charlie Turley in the 1960's by cutting grooves in a large stump with a chainsaw; Charlie then drove railroad spikes in to bend the snowshoe frame around. Charlie began by thinning the toe ends and lapping them, bending them first.

Percy Sterritt bends the tail curves first (Figure 4-16b), then makes the lap joint and bends the toe (see diagram). Percy makes the cross-pieces of maple for strength. He related that his grandfather made much lighter snowshoes out of small diameter maple, getting one side per stem, and used cross-pieces of pine. Percy commented that strong snowshoes were better for tobogganing with dogs, which is the way people trapped when he was a young man. Because of this, combined with the availability of efficient metal and power tools, he prefers to make heavier shoes.

Snowshoes are filled with babiche, stretched rawhide cord. Lighter babiche such as that from deer hide or caribou hide is used for the fine filling. (Figure 4-16 c, d) Heavy, coarse hide is used for the filling under the foot. Today, this is usually cowhide or moose hide.

Maple wood was also carved into spoons. According to Smith's consultants, the wood was made into spoons, snowshoes, shamans' rattles, chiefs' rattles and soapberry spoons, but not masks (n.d.:119-120). Smith diagrams a "soapollali" spoon, used for eating soapberry froth, similar to the spoon shown in Figure 4-17. Maple could also be used for canoe paddles and carved scoop-like canoe bailers (Smith n.d.:97).

Maple inner bark was harvested in a similar way to cedar bark. Maple mats were said to be much more durable and wear resistant than cedarbark mats (Sadie Howard). The bark from a young tree was more flexible. It was gathered in early Spring (Olive Ryan 7/25/95). Maple bark remained white, rather than darkening and turning brown like cedar bark. According to Harlan Smith's consultants, the bark could be dyed black with mud, and red with alder bark or mud (Smith n.d.:119-120). Sadie Howard's father-in-law said that maple bark could be used for snowshoe filling instead of babiche, and that it was more durable (Sadie Howard 10/8/86). Maplebark baskets were also made in Gitwingax̱ and Gitsegukla (LaForet 1984). Smith photographed various maple bark baskets in the Gitwingax̱ area in 1925-26.[21]

birchbark *Betula papyrifera*

Birchbark was used for baskets and dishes, wrapping food (People of Ksan 1980), implements like moose calls, and for torches and firestarter. It could also be used to wrap corpses, and to make toboggans (Mathews n.d.). Birch is collected from a tree with smooth, unblemished bark in the late spring or early summer. The bark is slit, and the sheet of bark peeled from around the trunk, leaving the brown, non-pliable inner layer of bark still adhering to the trunk.

Baskets are made with fresh bark, cut out from standard patterns, and stitched together with either split spruce root or, according to Olive Ryan (7/12/95), with strong twine made from spreading dogbane. The rim can be formed of a flexible withe of either "yellow" willow (*Salix* spp.) or "red" willow (*Cornus stolonifera*, red osier dogwood). This is basted in place until the basket dries and hardens, when a decorative stitching of the outer splits of spruce roots is applied. A birchbark basket for berry picking was called **'no'o**. Birch baskets are no longer made by the Gitksan, although Harlan Smith photographed birch baskets from Gitwingax̱ and Gitsegukla in the mid-1920's (LaForet 1984) which are identical in form to those still made by the Wet'suwet'en in Moricetown (Gottesfeld 1994b).

Birchbark is bent into a cone about 1 foot long (30cm) and 5" (13 cm) diameter at the large end to form a moose call.

Torches are made by coiling birchbark around the end of a stick and lighting it. The Gitksan village of Git-anmaaxs ['people of the place of the birchbark torches'] is named after an oral history in which birchbark torches are used for night fishing.

red alder **amluux** *Alnus incana* and *A. rubra*

An infusion of the bark of red alder as red dye for the cedarbark neck rings worn by chiefs and secret society members red. Its name means "good for neckring." It was also used to dye cedar bark or maple bark red to produce pattern in woven baskets or mats. Alder wood also carves well, and is often used for **nax̱noḵ** masks (Figure 4-18). Smith (n.d.:97-98) reports that red alder was used for canoe bailers and paddles. It could also be used for firewood.

'mountain alder' **giist** *Alnus crispa*

According to David Green (1987) **giist** is good wood for carving spoons and for making axe handles. Abraham Fowler also reported that **giist** was good for making spoons (Smith n.d.:167). John Fowler said it was used for firewood (Smith n.d.:167).

pin cherry (*Prunus pensylvanica*), Choke cherry (*P. virginiana*), Pacific crabapple (*Malus fusca*) and black hawthorn (*Crataegus douglasii*), prickly rose (*Rosa acicularis)* and saskatoon (*Amelanchier alnifolia*)

The hard wood of the stems of various shrubs in the Rose family were used for tools. The wood of large shrubs such as pin cherry, chokecherry, hawthorn, and crabapple were used to make ax handles and adzes. The spines of hawthorn were used to make fishhooks. Rose stems and saskatoon stems were formerly used to make arrow shafts (Smith n.d.).

red osier dogwood, 'red willow' **x̱hlaahl** *Cornus stolonifera*

Red osier dogwood stems are very flexible. They were often used for the frame of the dome-like sweat house **anguxw'uutxw**. Thin branches could be used for the rim of birch bark baskets.

Red osier dogwood branches with abundant leaves were used to make a clean place to put fish in order to clean it, and to cover the fish to keep it cool (Mathews n.d.). Fern fronds and raspberry branches are also reported for this use (see fern fronds).

willow, 'yellow willow' **'waasan, am 'waasan** *Salix* spp., especially *Salix scouleriana* and other tree sized willows

Willow inner bark could be stripped in spring like cedar bark and used for tying and lashing; possibly the withes were also used (Mathews n.d.) It could also apparently be made into baskets (David Green 1987). Withes could be used to form the rim of birchbark baskets (Olive Ryan 1995).

yew **sganhaxwdakw** *Taxus brevifolia*

According to Stanley Williams, the name means 'bow plant'. Presumably, yew wood for bows, or completed bows of yew, were imported from coastal areas where yew trees grow. Yew wood is very hard and durable, and of superior flexibility, giving it the elastic strength needed for archery. Yew (from the European *Taxus baccata*) was also the wood of which the famed English long-bows of the Middle Ages were made.

juniper **sgan nax̱nok, sganhaxwdakw** in part, *Juniperus scopulorum*

Pete Muldoe gave the name **sganhaxwdakw** for the small tree juniper, and said that good saplings were used to make bows. Luke Fowler told Harlan Smith in 1926 that **sgannax̱noḵ** could be used to make a small bow; they were not large enough for large bows (:57).

pine pitch **sgena sginist** *Pinus contorta*

Trees were deliberately scarred so that the pitch would run; this then could be used as firestarter when camping in the area in wet weather in the future. A tree which had been scarred by 'cambium' collection was a good tree to cut for pitch collection (Robert Jackson Sr. 1994).

fireweed **haast** *Epilobium angustifolium*

The "skin" or outer part of fireweed stalks were used to make a strong red-brown coloured string which resembles spun cedarbark cord (Solomon Marsden, Jeff Harris Sr., Harlan Smith n.d.:155-156). This was used for nets and tumpline weaving (see nettle in Traditional Narrative section). Robert Sampare, one of Smith's consultants, considered fireweed string poor material for nets.

nettles **sdetxs, sdatxs** *Urtica dioica*

According to Harlan Smith (n.d.:99-100), nettle fibre was used by the Gitksan to manufacture nets and for tumpline weaving. No elder I have shown nettle string to has recognized it nor spoken of seeing it made or used. A Nisga'a elder from Aiyansh (Sam Gunuu 1986) did recognize it and remembered seeing his grandmother make it when he was very young. The Haisla remember making oolachan nets from the lush nettles growing on the delta of the Kitimat River. The memory of this seems to be lost among the Gitksan of the present time. The Tsimshian of Kitselas have an oral history which recounts the origin of the use of nettle fibre for fish nets and snares (see the section on nettle in Plants in Traditional Narrative).

spreading dogbane, **leeḵ** *Apocynum androsimaefolium*

Harlan Smith (1926:176-177) reports that the fibre of dogbane was spun and used for rabbit snares and snares for fox, lynx and ground-hog. It was also reported by him to have been used for the weft of tumplines and for fish nets. Jeff Harris Sr. reports that **leeḵ** was used to make string **gaakw** for snares. It was made by rolling it on the thigh and plied into two ply cord or 'rope'. Pete Muldoe and Olive Ryan identified specimens of *Apocynum androsimaefolium* as **leeḵ** in 1994 and 1995 and commented on its strength. Pete refers to it in English as 'nylon plant.' Olive described spinning the fibre on the thigh with a spindle, **halal**. Olive also mentioned that one could stitch together birchbark baskets with this string.

skunk cabbage **hinaḵ** *Lysichiton americanum*

Skunk cabbage is a large leaved herb in the Arum family which grows in swamps and areas with standing water. Its waxy leaves were used for wrapping food for pit cooking or for lining berry rack trays. When used to line berry racks, the petioles and midveins ("backbones") were removed to make a flat, even covering.

"bunchgrass", sedge or bullrush **habasxw** Gramineae or Cyperaceae, indet.

In 1926 Luke Fowler told Smith that 'bunch grass' was used for socks or insulation in mocassins, for babies' bedding, and as a ground covering where people sat around the fire "there formerly being no wooden floors" (Smith n.d.:72).

A type of **habasxw** that grows around the margins of lakes was also gathered in former times and made into baskets (Art Mathews Jr. 8/94, Beverley Anderson 8/94). In 1996 Art suggested this may have been cattail

habasxum t'ax̲ ("lake grass", covering). David Green (1987) described a species of "grass" that was triangular in cross section, which was used for baskets and mats, probably the same type as mentioned above. This was likely either a species of *Carex* or *Scirpus*.

fern fronds **damtx** (*Athyrium filix-foemina*, *Dryopteris expansa*, and possibly *Matteuccia struthiopteris*)

The fronds of ferns were gathered in large amounts to spread out for keeping fish clean during processing at the smoke house. Clean fronds were laid out, the fish laid on them, and more fronds put over the fish. Clean fronds were gathered daily, and the soiled ones disposed of down by the river, or "in the bush" (Sadie Howard 9/14/96).

peavine "wiping plant" **hagimgasxw** (*Lathrys nevadensis* and *L. ochroleucus*)

Peavine was picked for cleaning the slime off the outside of salmon before processing for the smokehouse. The outside of the fish were blotted or wiped with the vines. Apparently raspberry branches were also picked for this purpose (Olive Ryan 9/10/96).

clasping twisted stalk (in part), **x̲sduu'lixs** *Streptopus amplexifolius*

This plant can be used as a deodorant to mask human scent (Mathews n.d.).

cinder conk **mihlxwhl; diuxw** *Inonotus obliquus*

Cinder conk is reported by David Green (1987) to have been used for carrying fire from one camp to another. The smouldering conk was carried wrapped in birchbark and used to rekindle a fire in the new camp.

Powdered **mihlxwhl** or **diuxw** was apparently used for face powder; charred powder could be used to darken eyebrows and eyelashes (Mathews n.d.).

birch conk **diuxw** *Fomes fomentarius*

Birch conk can be used as a mosquito smudge. To use it, it is lit and set on the ground. (Olive Ryan 1994).

Conk or bracket fungus **g̱ayda ts'uuts'** "bird's hat"

Pete Muldoe (1987) said that conks were used for tinder. He called them a kind of "**g̱ayda ts'uuts'**."

sphagnum, 'diaper moss,' **umhlwx** *Sphagnum magellanicum* (in part) (Figure 4-19)

Diaper moss was collected from swamps (muskeg areas dominated by sphagnum moss and labrador tea, with bog cranberry), dried, and used for diapering babies. Only long, pale specimens are considered suitable for diapering and menstrual uses. Olive Ryan indicated that specimens of other wetland species, including *Aulacomium palustre*, *Tomenthypnum nitens*, *Sphagnum angustifolium*, and small, red specimens of *S. magellanicum* were not suitable because they were 'dirty' (Johnson-Gottesfeld and Vitt 1996). Large quantities of moss were gathered in the late summer and fall for winter use. Soiled moss was considered unclean (that is, contaminating), and was carefully disposed of. Illness or bad luck were consequences of lack of care in disposal (see Chapter 6.)

lungwort, 'frog blankets,' **gwilehl ganaa'w** *Lobaria pulmonaria*

Art Mathews (n.d.) reports that lungwort can be boiled with mountain goat wool as a yellow dye. My own experiments with dyeing with this lichen yielded a red brown colour on yarn spun from sheep's wool.

yellow lichen on pine clăānĭsĭs skinisht[22] cf. *Vulpicida canadensis*[23]

John Laknitz told Harlan Smith in 1925 that this lichen "is found on scrub pines and on the rock in the mountains...he had heard that it was used for making a yellow dye for mountain-goat wool. He said he had not seen it used" (Smith n.d.:37). Apparently *Letharia vulpina*, a different yellow lichen obtained by trade which contains vulpinic acid, was frequently used to dye mountain goat wool yellow in making Chilkat blankets (Samuel 1982). However, the locally available yellow lichen is an equally strong yellow dye and may well have been used instead of, or in addition to, *Letharia vulpina* in the Skeena Valley. I have obtained a very strong yellow colour on sheep's wool with *Vulpicida canadensis* which is virtually identical to that produced by *Letharia vulpina*.

PLANTS IN RITUAL

A brief summary of several plants used in ritual follows. The category "ritual" is mine; I have here included uses which do not seem in the ordinary sense to be technological, and which deal with special times and purposes like grave offerings or decorations, and puberty and child strengthening practices. I have also included two uses which might be characterized as "magical": a divination game, and a medicine used for gambling luck.

clubmoss **belena 'watsx̱** *Lycopodium clavatum*

In the recent past, clubmoss, which is evergreen and very slow to loose its colour, was used to make wreaths for graves (Beverley Anderson 1987). The name means 'otter belt'. Otters[24] were considered spiritually very powerful, but dangerous, causing madness or death in their human victims.

pearly everlasting **x̱sneenauntwxt** *Anaphalis margaritacea*

Pearly everlasting, a common member of the daisy family with white papery flowers that dry well, was one of the herbs placed with a corpse which was to be cremated (Art Mathews Jr. 7/5/96). Bob Robinson told Smith in 1926 that the flowers, because they last a long time, were "long ago placed on coffin boxes and graves" (Smith n.d.: 196).

Cedar boughs **lax̱sa simgan** *Thuja plicata*

Elders have recounted that cedar boughs were used in a ritual strengthening ordeal for young boys to make them hard workers; youths about 6 years of age were forced to swim in the icy river water, and when they emerged, were whipped with cedar boughs, and then dried off carefully and wrapped in a blanket. (Percy Sterritt, personal communication).

Cedar boughs or subalpine fir boughs were also used to cover the floor in the sweat hut (Beverley Anderson 1994).

Cow parsnip **ha'mooḵ** *Heracleum lanatum*

According to Smith's consultants, cow parsnip stalks were used for drinking straws for pubescent girls in the absence of a hollow bone (n.d.:168).

birch fungus **mihlxwhl** (*Inonotus obliquus* or other polypores?)

Polypores from birch, or sometimes hemlock, were apparently used in a sort of divination game by children in the latter part of the nineteenth century. Smith reports that "This burning fungus was also applied by little boys and girls to themselves to learn if they would make good husbands or wives, or would talk back. Those that stood it and did not quickly take it away were said would be good and not talk back. Those that took it away quickly would be the opposite. A group of five or six children might try this phophesing [sic] game" (n.d.:164). Smith's consultant Luke Fowler, aged 49 in 1926, had done this when he was young.

Angelica root **ha'mook̲hl g̲anaa'w** *Angelica genuflexa*

Angelica root was apparently used in a ritual to ensure gambling luck. Gamblers reportedly held a piece of the root in their mouth, and spit over their hands and the gambling bone while playing **lahal**. (Smith n.d.:171-172).

PLANTS IN PLAY

Again, the use of plants by playing children does not seem to be technological in the usual sense of the word. Neither does it seem to have the seriousness to qualify as ritual. Therefore, I have included two such uses recorded by Harlan Smith in this section.

Boys used the dried hollow cow parsnip stalks for "blowguns" with chokecherry and wild cherry pit shot (Smith n.d.:143)

Thimbleberry leaves were tied into a ball with willowbark twine for men or children to use in playing.[25] Patterns were bitten into folded thimbleberry leaves by children to make designs (apparently rather like cutting paper snowflakes) (Smith n.d.:147).

PLANTS IN TRADITIONAL NARRATIVE

The Gitksan have several different kinds of traditional narrative; these include **adaawak̲** or oral histories, which tell the significant events and supernatural empowering encounters of ancestors of a given Wilp or House, or a group of related Houses, and the various creation myths of the trickster 'Wiigat, or Big Man, the usual Gitksan name for Tx̲emsim, the raven. The **adaawak̲** are owned properties of Chiefs and Houses, and may not be told without permission from the owner, although a number of these have been recorded and published in the past.[26] The stories of 'Wiigat or Tx̲emsim are common property of all the people and may be told. They, unlike the oral histories, are not necessarily considered to be literally true. Plants figure in stories of both types. A thorough review of plants in Tsimshian, Nisg̲a'a and Gitksan oral histories is not in order here, though a few important examples from the published literature will be given.[27] There are also two stories from the 'Wiigat series that I want to include here, because the names of the plants in question are derived from the stories.

Nettles *Urtica dioica*

In 1948 Mrs. Harriet Hudson of the Canyon Tsimshian village of Kitselas told William Beynon the story of the origin of nettle fibre (Cove and MacDonald 1987:84-88). In this history, a group of people are starving out on the Coast by Metlakatla in early spring. Various groups of people move away from the winter village, because they cannot catch the spring salmon which are just off the coast waiting to migrate up the rivers. A young woman and her elderly mother are left behind, and are starving; a handsome young man begins to come in the night and have intercourse with the daughter. He takes her to gather nettles and shows her how to prepare the fibre for nets, which they set to catch the spring salmon they can see leaping in the waters around the village site. They begin to catch a great deal of fish, and the girl becomes pregnant. When the child is born, he is stretched by his father so that he grows extremely quickly.[28] He is shown how to hunt, snare, and make nets to catch fish. Then the father, really a supernatural spider, returns to his father in the sky, his purpose accomplished.

The now wealthy young woman, her mother, and her son eventually return to her people, bringing abundant gifts of food. Her maternal uncle, the chief, holds a feast with the food she and her son have brought, and acknowledges the son, his supernatural origin, and his valuable skills, which will enable the people to be secure and wealthy. Incidentally mentioned is that the woman taught the similar process by which fibre from fireweed is prepared for netmaking while teaching the use of nettle to her people.

This oral history shows features typical of many such stories, where an ancestress of the House, in distress, is rescued by a supernatural being who takes pity on her, takes her to wife, and gives gifts of special knowledge which then become important to the survival of her descendants.

devil's club *Oplopanax horridum*

Devil's club, as I have discussed earlier, is a very important medicine for purification and the ritual of **sisatxw.** A story recorded by William Beynon from Mrs. Hudson of Kitselas in 1947 briefly recounts the discovery of the properties of devil's club (Cove and MacDonald 1987:82-83).

A clean and pure prince, who was a great hunter, was able to get no game. After travelling all over his territory, he came to his hunting camp, tired and discouraged, and went to bed without eating. While he was sleeping, he had a vision of a beautiful woman. She showed him how to be successful, describing and demonstrating a common ritual of **sisatxw**, which involves four nights of sex with one clean and industrious woman, one night in each corner of the house, followed by four nights of abstinence, accompanied by bathing in devil's club liquid and drinking devil's club tea. This is to be followed by intercourse with the same woman, and then again by bathing in devil's club. The woman then revealed that she was devil's club, and it is her bark that he was to use. The prince then proceeded to do as instructed in his vision, and in consequence he was so successful "It seemed as if the game ran towards him."

Mrs. Hudson prefaces the story with a brief discussion of the importance of devil's club, and ends it with a discussion of how to use devil's club correctly for purification for hunting success.

fireweed *Epilobium angustifolium*

Fireweed Gisk̲'aast is the name of one of the four **Pdeek̲** or Clans of the Gitksan. The **k'ilhaast** , or single fireweed, was the first totem pole (Lily Jackson, personal communication 9/12 /96). In the story of the origin of Damlahamid (Temlax̲'aamit), Ken Harris, Chief Hax̲ Bagwootx̲w writes:

> And they planted the *gilhast* in front of their house. Overnight it grew and the next day they looked at it and it pierced the sky. This was the *gilhast* and the beginning of a new clan the *Gisgahast* (Harris 1974: 23.).

Another reference to **k'ilhaast** is recounted by Walter Wright in the late 1930's (Robinson 1962:27). Walter Wright was a Tsimshian chief of the Kitselas people. The oral history refers to the miraculous appearance of a single fireweed through the snow at the southern boundary of a newly claimed hunting territory.

> 'Guell haast'–the single fireweed,– he called that place. To this day 'Guell haast is the southern boundary of the hunting grounds of the Bear People.
>
> And from that day Guell Haast, the single fireweed, has had its place on the totems to tell of the time of famine and how the salvation of the people was wrought.

Queen's cup *Clintonia uniflora*

This plant is sometimes called **hoobixs 'wiigat**, Wiget's spoon. Luke Fowler told Harlan Smith the following story in 1926: "Wiget came to an invisible town made of air, the location of which is unknown. He went to one of the houses but there were no people in it, although he could hear people. He heard them laugh. They spoke to him, but he could not see them and so he called them air people. He saw a salmon, a kettle-basket, hot stones and a leaf of Queen's cup, which was a spoon. The salmon of its own accord went into the kettle-basket. The hot stones followed. The salmon when it was cooked went into a trough-shaped wooden dish and the Queen's Cup leaf spoon followed. Wiget ate the salmon with this leaf spoon." (n.d.:75).

bastard toad-flax *Commandra livida*

This plant was called **miits 'wiigat**, 'Wiget's berry' by John Fowler, who told Harlan Smith in 1926, "Wiget liked to eat salmon[29] and the salmon came out of the water on to the ground for him to eat them. He boiled and ate the salmon and he ate all the berries even this kind which are not eaten by the Gitksan. After eating all the berries he would move on to another place to eat" (Smith n.d.:101).

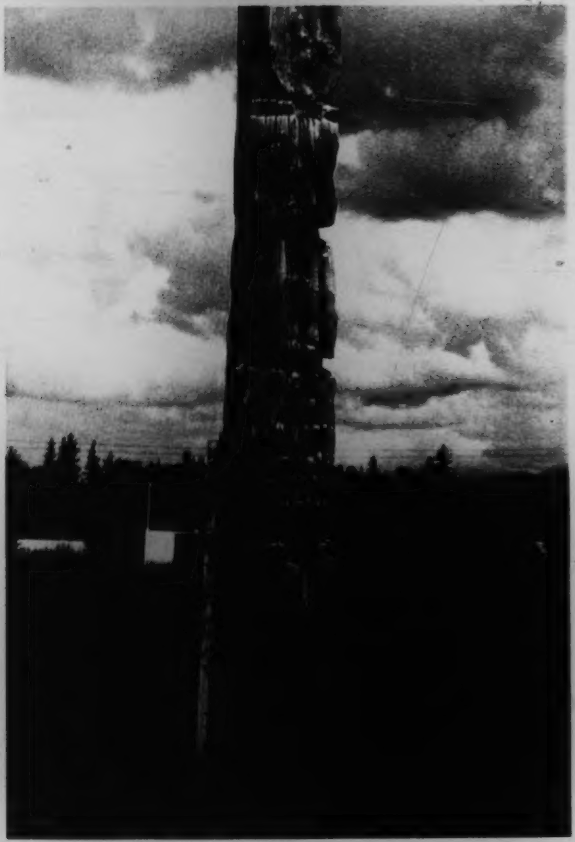
Discussion

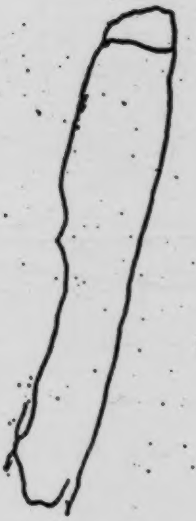
Plant use for the Gitksan, as with other peoples, is integrated into their total way of life, including subsistence, social organization, and cosmology. Plant use forms an important part of subsistence, and shapes much of material culture. These, in turn, are informed by other aspects of the culture, including its social structure, which requires accumulation for feasts which transfer titles, affirm territorial and other rights, and reenact the reciprocal relationships between clans united by marriage. Likewise, material culture includes not only the implements of subsistence and transportation, but also those objects which demonstrate wealth and prerogative, and those which are objects of power, like **nax̲nok̲** masks, and chiefs' and shamans' rattles.

Medicine and food procurement are intimately bound up also in the relationship to land, both as territory, enacting on the landscape the social structure, and as a spiritual relationship of oneness and reciprocity with other living beings. Violations of the relations of harmony and respect with the land will result in consequences for the abundance of the harvest of wild foods, and of health for the people. Medicines and foods both must be gathered in a spirit of thankfulness and respect. All things have a spiritual essence which can help people, or retaliate for mistreatment. Medicines, to be efficacious, must be gathered with prayer, in humility, and in clean places. For the Gitksan people, as I will discuss later, healing is not viewed as a mechanistic consequence of chemical or physical properties of the plant(s) taken. One must be prepared for healing to take place, and the medicine must be prepared correctly to be of benefit.

Figure 4-1 [top photo] Ax̲, the principal root food used by Gitksan people. It is the rhizome of the spiny woodfern, *Drypoteris expansa*.

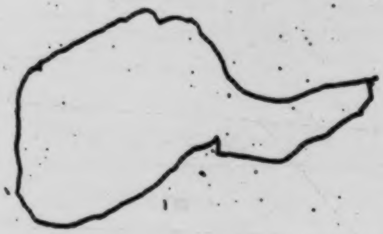
Figure 4-2 [lower photo] The 'Wii Ax̲ crest is shown on this pole of 'Woosimlaxha at Kispiox Village.





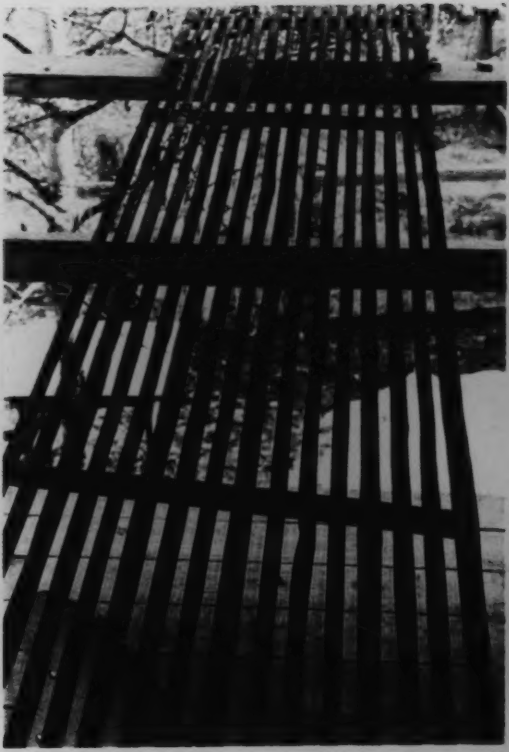
BONE SCRAPER FOR PINE 'CAMBIUM'

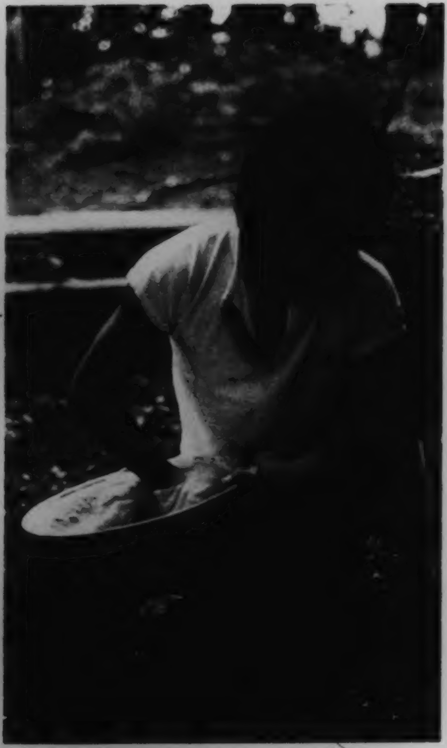
IRON BLADE FOR SCRAPING HEMLOCK INNER BARK



Sketches Drawn By Olive Ryan
From Interview Notes 8/4/95

Figure 4-3 TRADITIONAL GITKSAN KNIVES FOR SCRAPING 'CAMBIUM'





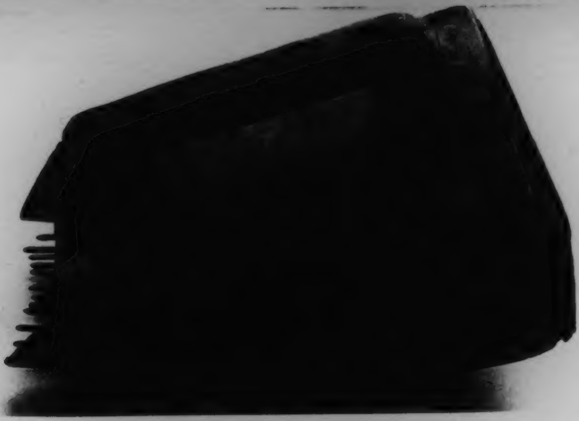
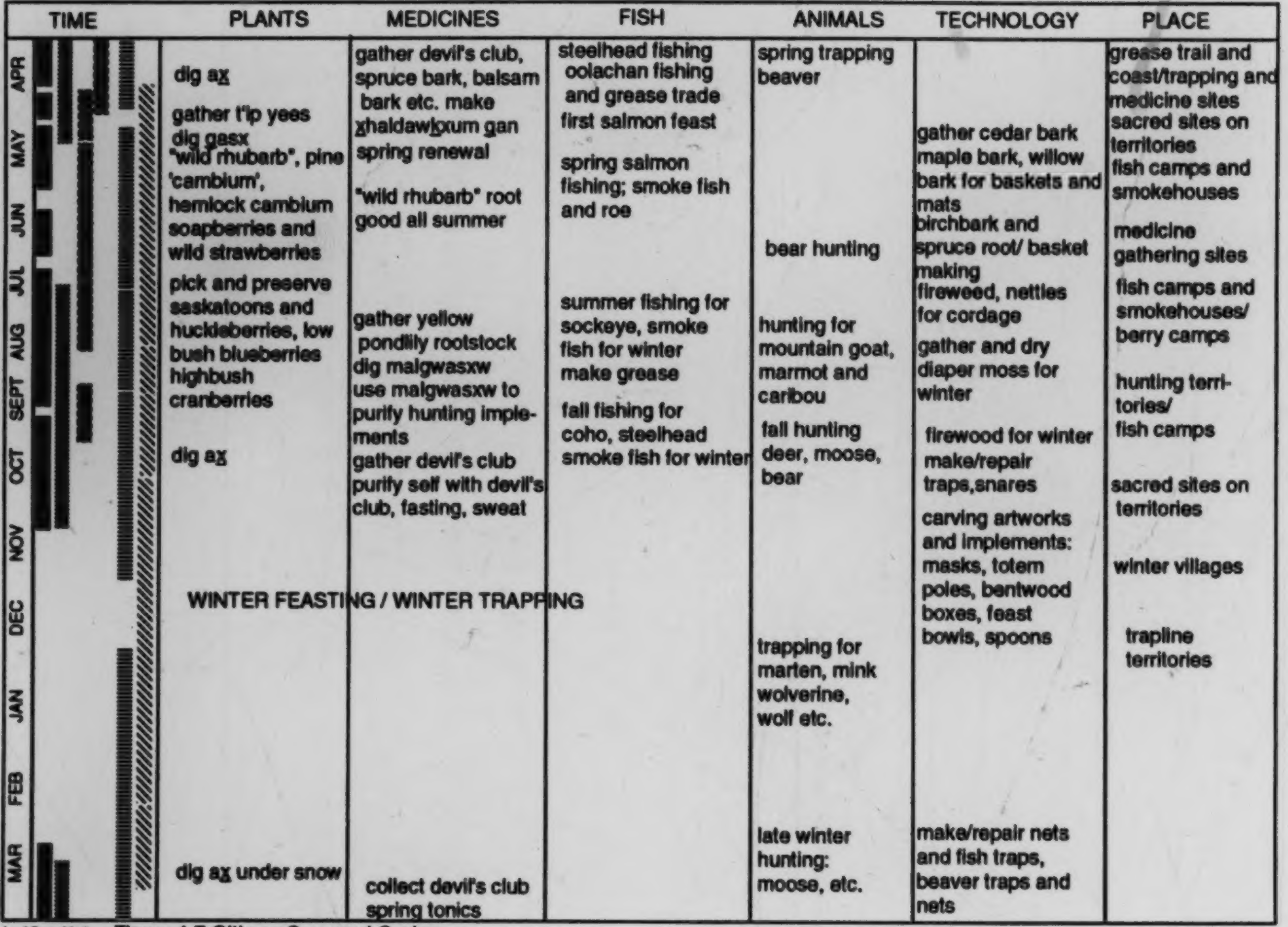


Figure 4-4 Berry drying rack **sk̲'eex̲sin** made of split cedar splints by Phillip Howard's father, Gitsegukla.

Figure 4-5 Paul [ ] whipping soapberries **yal'is** at First Salmon Ceremony at Ritchie, July 1994.

Figure 4-6 Berry picker belonging to Raymond and Lavender Morgan, Gitwingax̲. The berry picker has been in the Morgan family since at least the mid 1930's.



TIME	PLANTS	MEDICINES	FISH	ANIMALS	TECHNOLOGY	PLACE
APR	dig ax̲ gather t'ip yees	gather devil's club, spruce bark, balsam bark etc. make x̲haldawk̲xum g̲an spring renewal	steelhead fishing oolachan fishing and grease trade first salmon feast	spring trapping beaver		grease trail and coast/trapping and medicine sites sacred sites on territories
MAY	dig gasx "wild rhubarb", pine 'cambium', hemlock cambium	"wild rhubarb" root good all summer	spring salmon fishing; smoke fish and roe		gather cedar bark maple bark, willow bark for baskets and mats	fish camps and smokehouses
JUN	soapberries and wild strawberries			bear hunting	birchbark and spruce root/ basket making	medicine gathering sites
JUL	pick and preserve saskatoons and huckleberries, low bush blueberries				fireweed, nettles for cordage	fish camps and smokehouses/ berry camps
AUG	highbush cranberries	gather yellow pondlily rootstock dig malgwasxw	summer fishing for sockeye, smoke fish for winter make grease	hunting for mountain goat, marmot and caribou	gather and dry diaper moss for winter	
SEPT		use malgwasxw to purify hunting implements	fall fishing for coho, steelhead smoke fish for winter			hunting territories/ fish camps
OCT	dig ax̲	gather devil's club purify self with devil's club, fasting, sweat		fall hunting deer, moose, bear	firewood for winter make/repair traps,snares	sacred sites on territories
NOV					carving artworks and implements: masks, totem poles, bentwood boxes, feast bowls, spoons	winter villages
DEC	WINTER FEASTING / WINTER TRAPPING					trapline territories
JAN				trapping for marten, mink wolverine, wolf etc.		
FEB						
MAR	dig ax̲ under snow	collect devil's club spring tonics		late winter hunting: moose, etc.	make/repair nets and fish traps, beaver traps and nets	

lmj/ba '94 Figure 4-7 Gitksan Seasonal Cycles

Figure 4-8 [upper photo] Two traditional adzes for carving belonging to Raymond Morgan. These adzes were used by Ray to carve a replacement eagle for the top of the Tewalasu totem pole in Gitwingax after the original was lost rescuing the pole from the 1936 flood. These adzes have steel blades, but are identical in form to ancient adzes with nephrite blades.

Figure 4-9 [lower left] Old bentwood box **gal'ink**, belonging to Rose Morrison of Git-anmaaxs Village. The painting was done about 20 years ago by Vernon Stephens.

Figure 4-10 [lower right] Trees stripped for whole cedar bark on bench above Sedan Creek about 12 km from Gitwingax.

Figure 4-11 Rose Gottesfeld demonstrating stripping cedar bark.

a) pulling bark upward off of trunk

b) holding bundle of freshly peeled bark

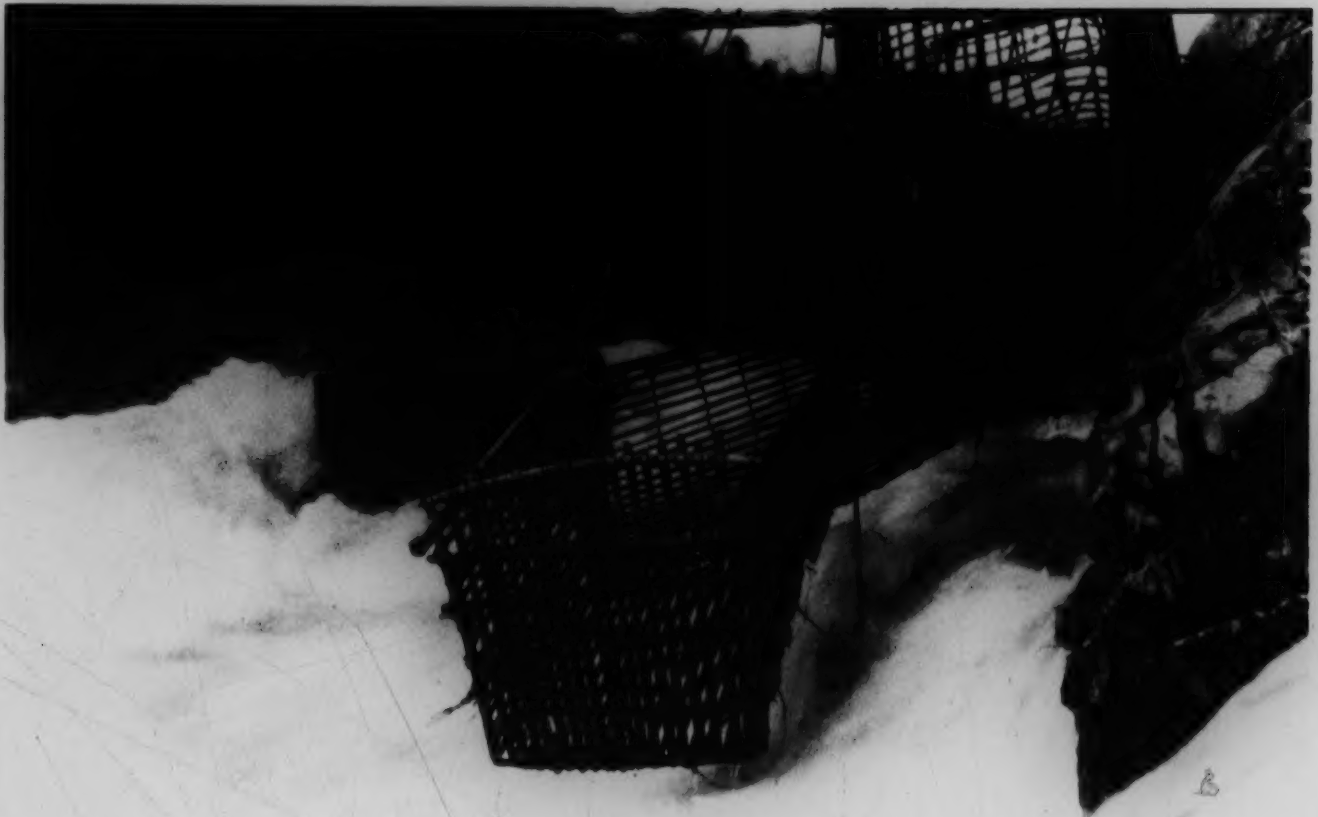


Figure 4-12 Fish trap in Hagwilget Canyon, Provincial Archives of BC HP-28541 (B-00705).

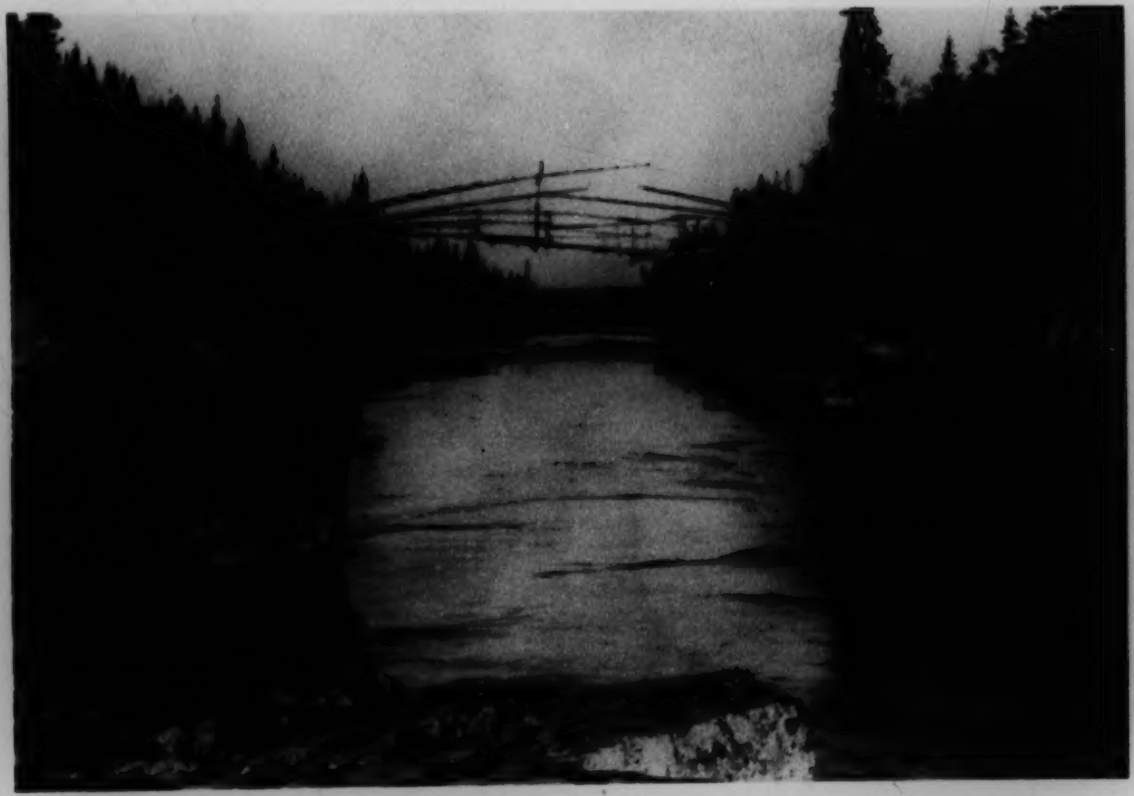


Figure 4-13 Suspension bridge on "Sestoot" River, 1899 National Archives of Canada PA 83106.

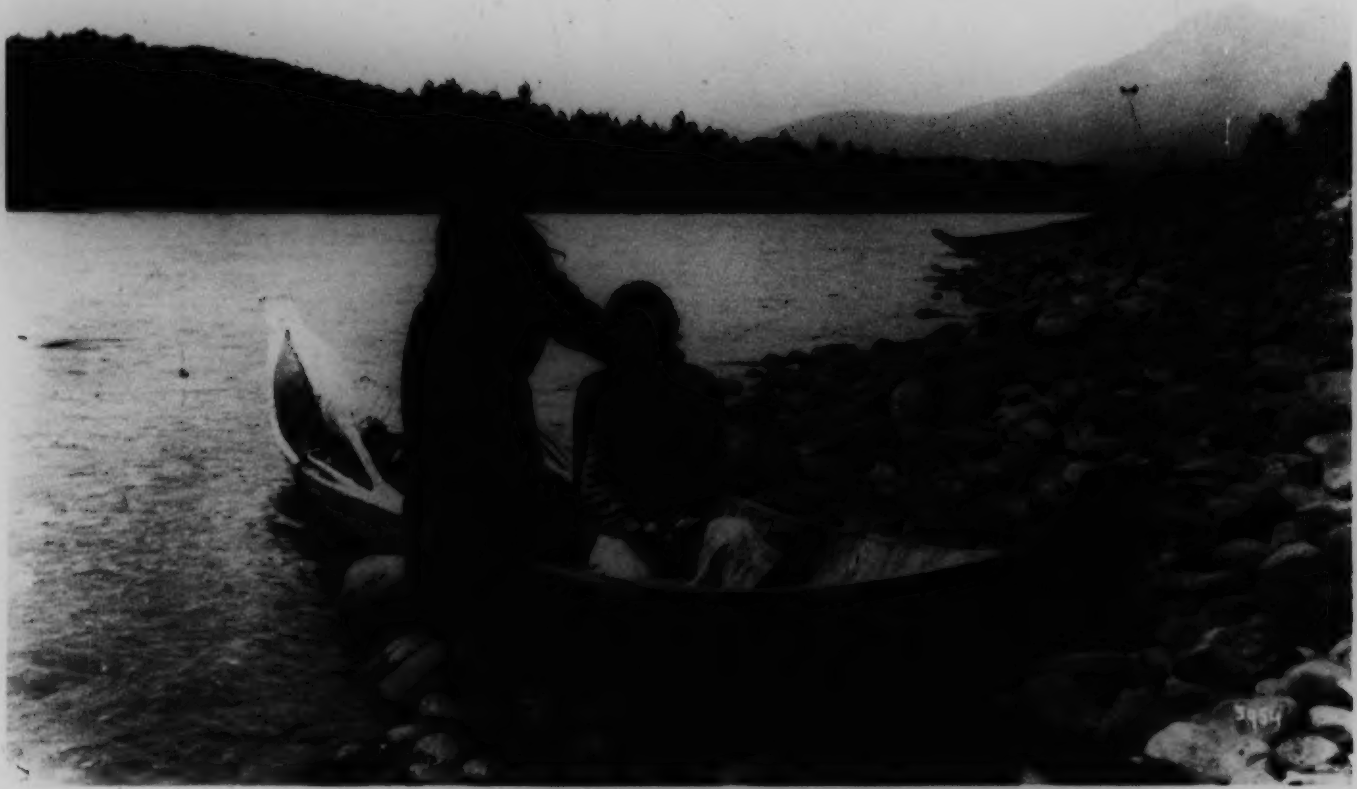


Figure 4-14 Two young girls in a cottonwood dugout canoe, Gitwingax, 1915. National Archives of Canada PA 11227.

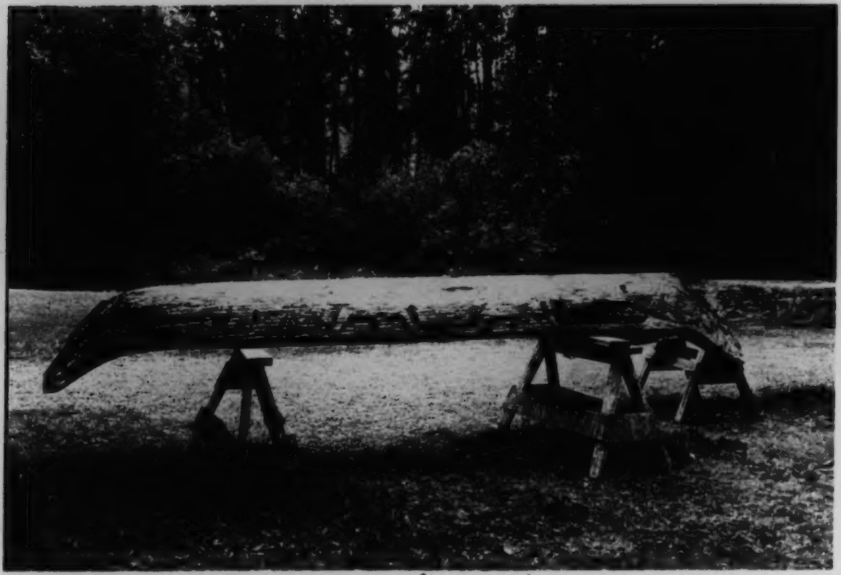
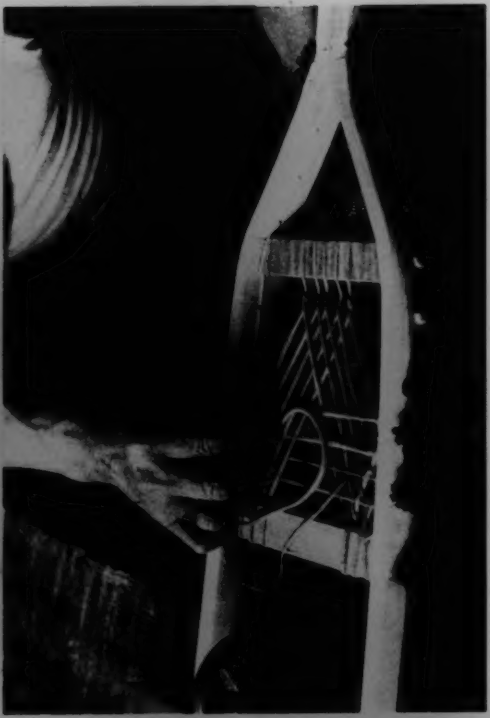
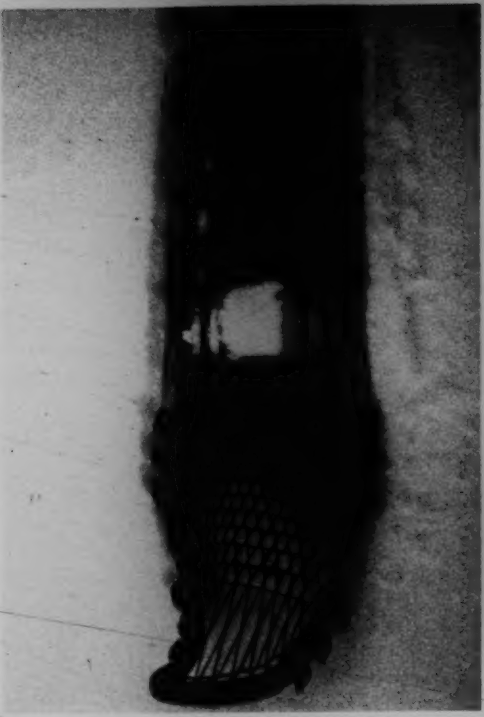


Figure 4-15 Painted cottonwood dugout canoe on display at Ksan Village, Hazelton. Photographed in 1994.

Figure 4-16 Snowshoe making by Percy Sterritt of Kispiox B.C., 1989

a Gitksan snowshoe made for the author's daughter. [lower left]
b Snowshoe frames under construction in Percy's shop. [upper left]
c Beginning the fine filling of the tail section with deerhide babiche cut by the late Madeline Alfred of Moricetown. [lower right]
d Continuing the fine filling. [upper right]





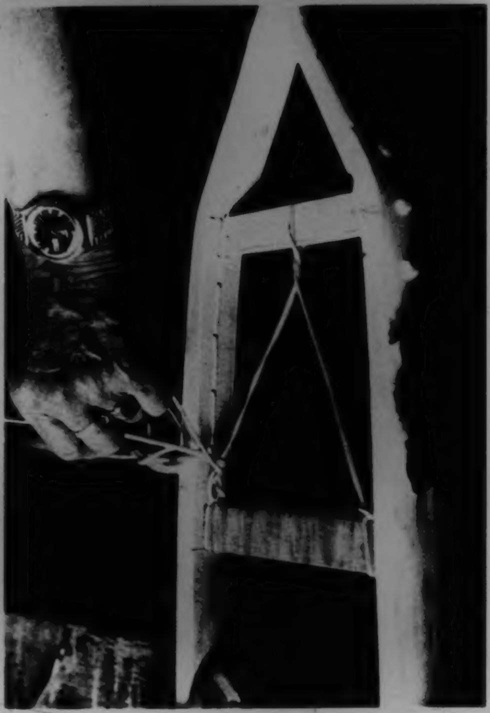


Figure 4-17 Soapberry spoon carved by Virginia Morgan, Gitwingax, 1995. [upper photo]

Figure 4-18 Naxnok mask of red alder carved for Chief Gitludahl, Peter Muldoe, by Eric MacPherson in 1994 for Earl Muldon (Delg̀am Uukw). This mask is a replica of one in the collections Canadian Museum of Civilization, carved, according to information given by the Museum, to replace the original which was purchased in the 1920's. [middle photo]

Figure 4-19 Diaper moss *Sphagnum magellanicum* collected near South Hazelton, August 1995. [lower photo]

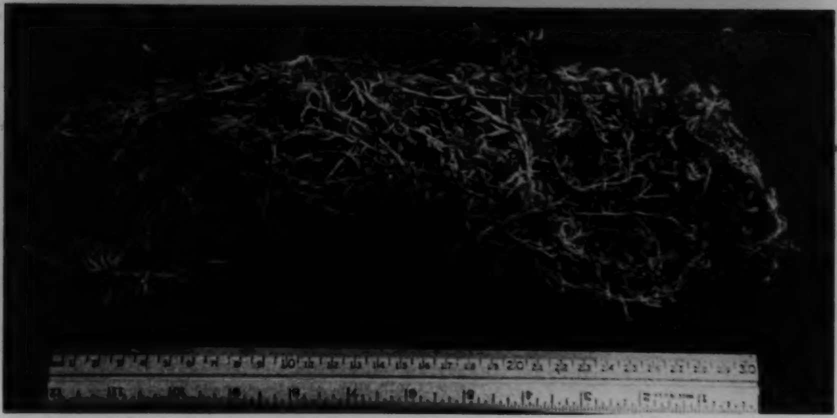


TABLE 4-1
GITKSAN FOOD PLANTS

English name	Latin name(s)	Fruits	Roots[1]	Inner bark	'Greens'	Other
aspen, trembling	*Populus tremuloides*			√[2]		
blueberry, lowbush	*Vaccinium caespitosum*	√				
bunchberry	*Cornus canadensis*	√				
'carrots'	*Daucus carrota; Lupinus ?nootkatensis*		√			
chokecherry	*Prunus virginiana* var. *melanocarpa*					
columbine, red	*Aquilegia formosa*					√
cottonwood, black	*Populus balsamifera* ssp. *trichocarpa*			√[3]		
cow parsnip, 'wild rhubarb'	*Heracleum lanatum*				√	
crabapple, Pacific	*Malus fuscus*	√				
cranberry, bog and ?lowbush	*Vaccinium oxycoccos* and *?V. vitis-idaea*	√				
cranberry, highbush	*Viburnum edule*	√				
currant, wild blue	*Ribes laxiflorum* ?	√				
elderberry, red	*Sambucus racemosa*	√				
fir, subalpine	*Abies lasiocarpa*			√		
fireweed	*Epilobium angustifolium*				√	
'frogberries'	*Rubus pubescens*	√				
gooseberry, northern	*Ribes oxyacanthoides*	√				
hawthorn, black, 'thornberry'	*Crataegus douglasii*	√				
hazelnut, beaked	*Corylus cornuta*	√				
hemlock, western	*Tsuga heterophylla*			√		
highbush blueberry	*Vaccinium ovalifolium*	√				
huckleberry, black	*Vaccinium membranaceum*	√				
kinnikinnik	*Artostaphylos uva-ursi*	√				
Labrador tea, 'swamp tea'	*Ledum groenlandicum*					√
nettle, stinging	*Urtica dioica*				√[4]	
onion, nodding	*Allium cernuum*				√	
pincherry	*Prunus pensylvanica*	√				
pine, lodgepole	*Pinus contorta*			√		
raspberry	*Rubus ideaus*	√				
riceroot lily	*Fritillaria camschatcensis*		√			
rose (hips)	*Rosa acicularis*	√				
salmonberry	*Rubus spectabilis*	√				
saskatoon	*Amelanchier alnifolia*	√				
soapberry	*Shepherdia canadensis*	√				
Solomon's Seal, false	*Smilacina racemosa*	√				
spiny woodfern	*Drypoteris expansa*		√			
spruce	*P. x lutzii*			√		

TABLE 4-1
GITKSAN FOOD PLANTS

English name	Latin name(s)	Fruits	Roots[1]	Inner bark	'Greens'	Other
stonecrop	*Sedum divergens*				✓	
strawberry bramble	*Rubus pedatus*	✓				
strawberry, wild	*Fragaria virginiana*	✓				
thimbleberry	*Rubus parviflorus*	✓				

1 includes true roots, rhizomes and bulbs

2,3 use for food reported in Smith n.d.; not mentioned in modern fieldwork

4 one modern report which may be learned from edible plant manuals or local Eurocanadian settlers

TABLE 4-2
GITKSAN MEDICINAL PLANTS

English name	Latin name(s)	parts used	tonic	circulatory/ heart	flu	respiratory	skin	hair	arthritis/ rheumatism
alder	*Alnus incana* and *A. rubra*	bark, cones							
alder, 'mountain'	*Alnus crispa*	bark, cones				√			
amabilis fir	*Abies amabilis*	bark							
anemone	*Anemone multifida*	roots							
angelica	*Angelica genuflexa*	root							
arnica, heart-leaved, 'sunflower'	*Arnica cordifolia*	leaves					√		
aspen, trembling	*Populus tremuloides*	bark							
avens, large-leaved	*Geum macrophyllum*	leaves, plant					√		
'bear's berries'	*Aralia nudicaulis?* or *Actaea rubra?*	root					√		
'birch fungus'	*Inonotus obliquus* and *Fomes ignarius*	fruiting body							√
black hawthorn, , 'thornberry'	*Crataegus douglasii*	bark, stems							
black twinberry, 'crowberry'	*Lonicera involucrata*	inner bark, fruits							
'carrots' ?	*Lupinus arcticus*	root							
clubmoss	*Lycopodium* spp.	spores					√		
cow parsnip, 'wild rhubarb'	*Heracleum lanatum*	root							√
devil's club	*Oplopanax horridum*	inner bark, root	√	√	√	√			√
hemlock, western	*Tsuga heterophylla*	inner bark, bark	√			√			
highbush cranberry	*Viburnum edule*	twigs, stems				√			
horsetails and scouring rushes	*Equisetum arvense, E. variegatum, E. hyemale*	whole plant							
horsetail, meadow	*Equisetum pratense*	whole plant							
Indian or False hellebore	*Veratrum viride*	rhizome, (leaf)					√		√
Indian paintbrush	*Castilleja miniata*	whole plant or seeds							
'inedible fern root'	*Athyrium filix femina, Drypteris felix-mas,* and small *Dryopteris expansa*	rhizome							
juniper	*Juniperus communis* and*J. scopulorum*	leafy stems, fruits	√			√			
Labrador tea, 'swamp tea'	*Ledum groenlandicum*	leaves	√						√
lungwort, 'frog blankets'	*Lobaria pulmonaria* and *L.oregana*	thallus							√
mountain ash	*Sorbus sitchensis* and *S. scopulina*	twigs							
Pacific crabapple	*Malus fuscus*	inner bark, branches	√			√			√
pincherry	*Prunus pensylvanica*	bark				√			
pine, lodgepole	*Pinus contorta*	bark, tips, pitch							√
pond lily, yellow	*Nuphar polysepalum*	rhizome	√			√	√		√
red elderberry	*Sambucus racemosa*	root bark			√	√			
red osier dogwood	*Cornus stolonifera*	roots; inner bark					√		√
Sitka valerian	*Valeriana sitchensis*	rhizome							
soapberry	*Shepherdia canadensis*	fruits, leaves, stems,		√		√			√

TABLE 4-2
GITKSAN MEDICINAL PLANTS

English name	Latin name(s)	parts used	tonic	circulatory/ heart	flu	respiratory	skin	hair	arthritis/ rheumatism
soapberry	*Shepherdia canadensis*	roots							
Solomon's Seal, false	*Smilacina racemosa*	rhizome [check]							
spruce	*P. x lutzii , P. mariana, P. glauca*	bark, tips, pitch							
subalpine fir, 'balsam'	*Abies lasiocarpa*	bark, cones, pitch	√			√			
wild calla or water arum	*Calla palustris*	rhizomes	√						
wild sarsaparilla ?	*Aralia nudicaulis* ?	rhizome							
x̲aadax̲ unknown spiky plant		whole plant?							
yarrow	*Achillea millaefolium*	roots or fresh tops		√					

TABLE 4-2
GITKSAN MEDICINAL PLANTS

English name	Latin name(s)	parts used	digestive stomach	wounds or burns	pain	unspecified/ general	infection/ protect.	boils	urinary
alder	*Alnus incana* and *A. rubra*	bark, cones			√				
alder, 'mountain'	*Alnus crispa*	bark, cones							
amabilis fir	*Abies amabilis*	bark							
anemone	*Anemone multifida*	roots		√					
angelica	*Angelica genuflexa*	root							
arnica, heart-leaved	*Arnica cordifolia*	leaves							
aspen, trembling	*Populus tremuloides*	bark							
avens, large-leaved	*Geum macrophyllum*	leaves, plant							
'bear's berry'	*Aralia nudicaulis?* or*Actaea rubra?*	root		√					
'birch fungus'	*Inonotus obliquus* and *Fomes ignarius*	fruiting body			√				
black hawthorn, 'thornberry'	*Crataegus douglasii*	bark, stems							
black twinberry, 'crowberry'	*Lonicera involucrata*	inner bark, fruits							
'carrots' ?	*Lupinus arcticus*	root							
clubmoss	*Lycopodiium spp.*	spores		√					
cow parsnip, 'wild rhubarb'	*Heracleum lanatum*	root							
devil's club	*Oplopanax horridum*	inner bark, root	√	√		√			
hemlock, western	*Tsuga heterophylla*	inner bark, bark							
highbush cranberry	*Viburnum edule*	twigs, stems				√			
horsetails and scouring rushes	*Equisetum arvense, E. variegatum, E. hyemale*	whole plant							
horsetail, meadow	*Equisetum pratense*								
Indian or False hellebore	*Veratrum viride*	rhizome, (leaf)					√	√	
Indian paintbrush	*Castilleja miniata*	whole plant or seeds							
'inedible fern root'	*Athyrium filix femina, Drypteris felix-mas,* and small *Dryopteris expansa*	rhizome							
juniper	*Juniperus communis* and*J. scopulorum*	leafy stems, fruits							√
Labrador tea, 'swamp tea'	*Ledum groenlandicum*	leaves							
lungwort, 'frog blankets'	*Lobaria pulmonaria* and *L.oregana*	thallus							
mountain ash	*Sorbus sitchensis* and *S. scopulina*	twigs	√			√			
Pacific crabapple	*Malus fuscus*								
pincherry	*Prunus pensylvanica*	bark							
pine, lodgepole	*Pinus contorta*	bark, tips, pitch						√	
pond lily, yellow	*Nuphar polysepalum*	rhizome	√			√			
red elderberry	*Sambucus racemosa*	root bark							
red osier dogwood	*Cornus stolonifera*	roots; inner bark				√(topical)			
Sitka valerian	*Valeriana sitchensis*	rhizome					√		
soapberry	*Shepherdia canadensis*	fruits, leaves, stems, roots	√						√

TABLE 4-2
GITKSAN MEDICINAL PLANTS

English name	Latin name(s)	parts used	digestive stomach	wounds or burns	pain	unspecified/ general	infection/ protect.	boils	urinary
Solomon's Seal, false	*Smilacina racemosa*	rhizome [check]							
spruce	*P. x lutzii , P. mariana, P. glauca*	bark, tips, pitch		✓				✓	
subalpine fir, 'balsam'	*Abies lasiocarpa*	bark, cones, pitch	✓				✓		
valerian	*Valeriana sitchensis*	rhizome							
wild calla or water arum	*Calla palustris*	rhizomes							
wild sarsaparilla ?	*Aralia nudicaulis ?*	rhizome		✓					
x̲aadax̲ unknown spiky plant with three parts		whole plant?							
yarrow	*Achillea millaefolium*	roots or fresh tops		✓				✓	

TABLE 4-2
GITKSAN MEDICINAL PLANTS

English name	Latin name(s)	parts used	childbirth	cleanser/ purgative	emetic	purification/ spiritual	VD	eye	diabetes	broken bones	cancer
alder	*Alnus incana* and *A. rubra*	bark, cones									
alder, 'mountain'	*Alnus crispa*	bark, cones					√				
amabilis fir	*Abies amabilis*	bark									
anemone	*Anemone multifida*	roots									
angelica	*Angelica genuflexa*	roots						√			
arnica, heart-leaved	*Arnica cordifolia*	leaves									
aspen, trembling	*Populus tremuloides*	bark		√							
avens, large-leaved	*Geum macrophyllum*	leaves, plant									
'bear's berries'	*Aralia nudicaulis?* or *Actaea rubra?*	roots									
'birch fungus'	*Inonotus obliquus* & *Fomes ignarius*	fruiting body									
black hawthorn	*Crataegus douglasii*	bark, stems									
black twinberry	*Lonicera involucrata*	inner bark, fruits						√			
'carrots' ?	*Lupinus arcticus*	root									
clubmoss	*Lycopocium* spp.	spores									
cow parsnip	*Heracleum lanatum*	root				√					
devil's club	*Oplopanax horridum*	inner bark, root		√		√			√		√
hemlock, western	*Tsuga heterophylla*	inner bark, bark									
highbush cranberry	*Viburnum edule*	twigs, stems									
horsetails and scouring rush	*Equisetum arvense, E. variegatum, E. hyemale*	whole plant									
horsetail, meadow	*Equisetum pratense*										
Indian or False hellebore	*Veratrum viride*	rhizome, (leaf)		√		√					
Indian paintbrush	*Castilleja miniata*	whole plant or seeds									
'inedible fern root'	*Athyrium filix femina, Dryopteris felix-mas,* and small *Dryopteris expansa*	rhizome									
juniper	*Juniperus communis* & *J. scopulorum*	leafy stems, fruits				√					
Labrador tea, 'swamp tea'	*Ledum groenlandicum*	leaves									
lungwort, 'frog blankets'	*Lobaria pulmonaria* & *L.oregana*	thallus				√					
mountain ash	*Sorbus sitchensis* & *S. scopulina*	twigs									
Pacific crabapple	*Malus fuscus*	inner bark, branches						√			
pincherry	*Prunus pensylvanica*	bark									
pine, lodgepole	*Pinus contorta*	bark, tips, pitch		√							
pond lily, yellow	*Nuphar polysepalum*	rhizome								√	
red elderberry	*Sambucus racemosa*	root bark		√	√	√					
red osier dogwood	*Cornus stolonifera*	roots								√	
Sitka valerian	*Valeriana sitchensis*	rhizome									
soapberry	*Shepherdia canadensis*	fruits, leaves, stem	√								

TABLE 4-2

GITKSAN MEDICINAL PLANTS

English name	Latin name(s)	parts used	childbirth	cleanser/ purgative	emetic	purification/ spiritual	VD	eye	diabetes	broken bones	cancer
		roots									
Solomon's Seal, false	*Smilacina racemosa*	rhizome [check]									
spruce	*P. x lutzii*, *P. mariana*, *P. glauca*	bark, tips, pitch									
subalpine fir, 'balsam'	*Abies lasiocarpa*	bark, cones, pitch		✓			✓				
wild calla or water arum	*Calla palustris*	rhizomes									
wild sarsaparilla ?	*Aralia nudicaulis* ?	rhizome									
x̲aadax̲ unknown		whole plant?									
yarrow	*Achillea millaefolium*	roots or fresh tops									

Notes

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[1] Gitksan terms are given in boldface throughout the text. Spellings represent a necessary compromise between individual and dialectal variation and the necessity to choose a spelling that is generally representative and widely understandable. Bruce Rigsby assisted with transcription of terms from interview tapes and helped to suggest standard spellings. Any errors which remain are my own responsibility.

[2] I use the past tense here because it is generally believed that there are no longer traditional **halayt** in Gitksan communities. The last working **halayt** is supposed to have died in the mid 1960's. There are people who have one degree or another of herbal expertise or spiritual power, and they may treat non-relatives on request.

[3] The remarkable testimony of Isaac Tens recorded by Barbeau (1958:31-55) describes both the training and practice of a **swanasxum halayt**. Barbeau also contains photographs of a reenactment of healing ceremonies.

[4] Timothy Johns (1990) and Nina Etkin (1994) discuss the role of secondary compounds in foods, spices and medicines and their probable role in health as well as nutrition. Etkin (1994, 1988; Etkin and Ross 1991) in particular explores the role seasonal foods as an antimalarial regimen in West Africa and argues eloquently for consideration of total exposure to pharmacologically active compounds in plants [and one might add, animals] in ethnopharmacology.

[5] Cambium, in the botanical sense, consists in the single dividing cell layer from which arises both new wood tissue and new bark. The portion collected by people when they eat what has been called cambium in the ethnographic and ethnobotanical literature, is a thicker layer than this, and includes newly formed active phloem, or sap transporting, cells. I have therefore enclosed the term in quotations to indicate that something other than the strict botanical meaning is intended.

[6] The discovery of the 'Wii'Ax̲ in the ashes may encapsulate in narrative form the discovery of how to cook *Dryopteris* rootstock; it was commonly pit cooked overnight and eaten in the morning. It can also be cooked by being buried in the ashes of a fire overnight (Turner *et al.* 1992).

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[7] The Haisla probably ate the roots of *Lupinus nootkatensis*, a widespread coastal lupine species (see discussion in Pojar and MacKinnon 1994), although this has not been verified botanically. The specimen I have collected may be a hybrid between *L. nootkatensis* and *L. polyphyllus*, as the leaves are glabrous above. One of the species mentioned in Kingsbury (1964) is *L. polyphyllus*. See discussion in Chapter 7.

[8] Bruce Rigsby gives "where they make/get **ḵ'awts**" as the meaning of the name (personal communication 1997).

[9] Morice (1893) figures a Carrier horn pine cambium scraper; the Gitksan bone knife sketched by Olive differed from this knife in the lack of a concave curvature to the blade.

[10] The spruces of the Skeena Valley are a hybrid swarm of *Picea sitchensis*, *P. engelmannii*, and *P. glauca* in variable proportions. This hybrid is designated Roche spruce in British Columbia Forest Service Publications (Banner *et al*. 1993:A18), or *Picea* x *lutzii* (Pojar and MacKinnon 1994).

[11] See People of Ksan 1980 for more details on making berry cakes.

[12] The Gitksan use the English term "feast" as a general term for these various events. The general term is **li'ligit** in English. A major feast is called **yukxw**; a variety of specific terms denote different kinds of feasts (Gitksan interpreters n.d.) See Chapter 2 for a more extended discussion of feasts.

[13] Art Mathews points out that whether the m in **mii** is a hard or glottalized m (**'m**), is a feature which varies by dialect, and is more common in the Eastern villages (personal communication 9/15/96).

[14] Jenness (1943) explains this conception of power in medicines for Wet'suwet'en hunting medicines. His fieldwork was in Hagwilget, adjacent to the Gitksan village of Git-anmaaxs, in the 1920's. This factor may also be responsible for the relative lack of information regarding devil's club and spruce bark, frequent modern ingredients in **x̱haldawḵxum g̱an**, wood medicine, in Harlan Smith's manuscript on the Gitksan. People may have been more willing to discuss less important

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remedies, or remedies which other people used, more than those they they themselves used frequently.

[15] This is especially apparent in the entries in Smith's 1926 manuscript, where things are frequently described as purgative or diuretic. Whether these classes reflect his own medical concepts or those of his consultants is hard to ascertain at this point, but I have the sense that becoming "clean", and driving out wastes and impurities is an important indigenous concept.

[16] The concept of 'cleanliness' here involves both ordinary hygiene and removal of human scent, and becoming spiritually clean in order to enable luck.

[17] Pat Namox, a Wet'suwet'en elder, identified **hatic** as *Huperzia selago* based on the photograph in MacKinnon *et al.* 1992 (Hargus interview tape 6/10/96).

[18] A rigid heddle loom is a framework with regularly spaced slats, pierced by a central hole, separated by empty spaces or slots. The warp yarn is run through the central holes and the slots, which creates two sheds that can be alternately lifted. This type of loom is widely distributed in the world; whether it was independently invented in the Americas and in Eurasia has been a subject of debate (Sturtevant 1977.)

[19] This was also an aspect of respect for the fish (Cove and MacDonald 1987:)

[20] See Stewart (1984) for discussion of aboriginal techniques for using cedar and many illustrations from museum collections.

[21] LaForet (1984:233) figures a photograph of Mrs. Lewis Derrick of Kitwanga weaving a maple bark basket taken by Smith in the course of his fieldwork there in 1925-6 (NMC 65579).

[22] The orthography is as given by Smith, as I have never heard this term from a modern Gitksan person. Bruce Rigsby (personal communication 1997) suggests it may be **hla'anisihl sginist** "the branch of the pine", and thus presumably a description of the branch on which the lichen grew, rather than the name of the lichen.

[23] The identification is based on my local collections of lichen and by consultation with lichen expert Sylvia Durran Sharnoff in 1994. Smith gives *Cetraria juniperina* as his identification. The genus *Cetraria* has now been split, and those with vulpinic acid are placed in *Vulpicida*.

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[24] The otters (**'watsx**) are river otters, *Lontra canadensis*. They are often referred to in Northwest Coast literature as "land otters" to distinguish them from the quite different marine sea otters, *Enhydra lutris*. In point of fact "land otters" can be found in saltwater in protected coastal waters, as well as being frequent on large rivers and smaller lakes and rivers away from the coast.

[25] Possibly this would be safer than playing with animal parts; Visitors Who Never Left by Chief Ken Harris (1974) contains several graphic stories of disasters which befell people when the angry spirits of animals or fish took revenge on people for their lack of respect when people or children played inappropriately with animal parts.

[26] Important crests taken by the ancestors may serve as tokens of the events recounted in **adaawak̲**. I only know of three botanical crests which are represented on blankets, traditional wooden implements or totem poles: fireweed, "water lily" (Barbeau 1929) and spiny woodfern. Fireweed is, of course, the name of one of the four **pdeek̲** or phratries of the Gitksan. "Waterlily" is a crest of Gwi'nu'u in Git-anyaaw, and spiny woodfern root is a crest claimed by the house of Wosimlax̲ha (see footnote below, and Figure 2).

[27] The spiny woodfern also figures in the **adaawak̲** of the 'Wii'Ax̲ crest shown as Figure 2. This story is briefly recounted under the spiny woodfern section in this chapter.

[28] This is a common practice in Tsimshianic narratives of supernatural children.

[29] 'Wiigat is, among other things, a glutton, as well as a sort of powerful anti-hero who creates and changes the nature of things almost by accident. See Wiget Wanders On, by People of Ksan 1977 for a modern, illustrated, bilingual version of the stories of Wiget.

Chapter 5
Gitksan Plant Classification and Nomenclature

The Gitksan have a roughly hierarchical classification of plants (Figure 5-1). The general domain of "plant kingdom" or "floral form" is unmarked. Within this, several broad groupings of the "life form" sort can be distinguished. Three of these are large groupings composed of a number of named subordinate generics: trees, **gan**;'plants',**sgan**; and fruit plants, **maa'y**. The remainder are residual taxa which are empty in the sense of Turner (1974), containing few or no named subtypes, though comprising forms of morphological and taxonomic diversity: grass or hay, **habasxw**; 'leaves', or herbaceous plants, **'yans/'yens**; 'flowers', **majagalee**; moss, **umhlw**; and fungi, **gayda ts'uuts**. The precise nature of these groupings is open to debate; one could also perhaps consider them unaffiliated generics of distinctive habit (cf. Berlin 1992), or small intermediate groupings.

As indicated in Figure 5-1, fungi seem to be peripheral to the concept of 'plant' (which, indeed reflects their fundamentally distinct biology and is parallelled by the modern scientific classification of fungi as a separate kingdom, of equal rank with 'plant' and 'animal'[1]) and are not similar to any other types of plants.

Below the "life-form" level are found numerous generics, or basic kinds, which roughly correspond to the species and/or genera of the scientific botanical classification system (see Table 5-1). A smaller number of covert intermediate groupings of generics are also found (see discussion below).

"Life Forms"

Trees (see Table 5-2) comprise forms that are tall and woody, which are used for their wood and/or bark, predominantly for technological purposes and secondarily for medicine or food. Height relative to people, large size and woodiness appear to be the primary diagnostic characters. The word **gan** is employed to indicate forest ['among the trees' **spagaytgan**]. It is also the term for the tissue wood. Many tree names are of the formula 'good for_____'. This type of name is only found for tree species.

"Plants", **sgan**, seem to be a more heterogeneous grouping; plants included in this group are those for which informants spontaneously used the 'plant' term as part of the name when discussing the plant. Morphologically, these range from small trees and large shrubs, to small shrubs and evergreen perennial sub-shrubs, to large herbs, including at least one fern species. The boundaries between **sgan**, 'plant', and **'yans/'yens**, 'leaves', may be somewhat fuzzy, and at least for some consultants, some smaller herbaceous forms may be included in **sgan**. Taxonomically, gymnosperms, dicotyledonous and monocotyledonous angiosperms and ferns are included in this diverse class. Although consultants consistently offer 'plant' as the translation of the term **sgan**, Tarpent has analysed **/sgan/** to mean 'support' (Compton *et al.* in press.). On deeper probing, some consultants suggest a linkage between **sgan** and 'stem,' which is consistent with Tarpent's interpretation.

Plants in this grouping are often called by the name without the 'plant' term as well. Taxa in this grouping overlap extensively with the 'berry' grouping; most, or perhaps all, 'berries' are also 'plants'. Which term is used depends on the situation in part: whether the plant body or the fruits are the focus of attention.

The third evident grouping of plants is that of fruit-bearing species, or 'berries',[2] **'maa'y'**. The primacy of berries in the Gitksan diet is reflected in the importance of berries as a perceptual character of plants. I was often asked, for example, when presenting fresh plant specimens for identification, what the 'berry' was like, or if it had berries. The berry grouping contains the largest number of named types; at least ten of these are shared with the 'plant' group. This grouping is clearly focussed on edible fruits; plants with inedible berries seem to be peripheral members of the class.

The "empty" life forms seem to be ecologically important groupings of plants of distinctive morphology which are of little economic importance; within or associated with these life forms are a few types of economic importance, which appear to serve as prototypes. For example, in the moss grouping, which includes all terrestrial and aquatic or wetland moss species as well as perhaps morphologically similar vascular plant forms such as *Huperzia selago*, the prototype is clearly "diaper moss" **umhlw**, large pale sphagna which grow in wetlands and were traditionally important for diapering and menstrual needs (Johnson-Gottesfeld and Vitt 1996). As is common in folk classifications, the prototype is unmarked (e.g.

Ellen 1993: 83,85; Gottesfeld 1993; Johnson-Gottesfeld and Hargus in press; Hunn and French 1984; Turner 1987; etc.) Mosses from other environments are designated by descriptive phrases 'moss-on-soil' (Jeff Harris Sr. interview notes 10/19/87) or 'moss-under the tree' (Olive Ryan interview notes 7/25/95). One moss or liverwort (uncollected), reputed to form good waterproof bedding or thatch, has its own name.

The fungus grouping comprises "mushrooms", the fleshy fruiting bodies of basidiomycetes and some ascomycetes, and "conks" (bracket or shelf fungi), the woody perennial fruiting bodies of polypores, woodrotting fungi. They are all lumped as **gayda ts'uuts'** ('bird hat', or, metaphorically, 'penis') whether fleshy mushrooms on soil or woody polypores on trees or rotting logs. The two types distinguished by names are polypores on birch trunks which could be glossed in English 'birch fungus', and certain puffballs, which are called 'ghost fart' **masxwa luulak̲'** (E)/**mesxwa luukak̲'** (W) .[3] "Birch fungus' is called by two alternate terms, **mihlxw** ('charred'), or **diuxw**; it comprises at least two distinct Linnean species, the cinder conk *Inonotus obliquus*, and *Fomes ignarius*. Similar appearing species growing on hemlock trunks, for example, have no distinctive name and are simply called **gayda ts'uuts'**. Despite the great variety and abundance of fungal species in the environment, only the species growing on birch, which have economic use, and the perceptually salient and uncanny puffballs are named. No species of fleshy fungi were eaten by the Gitksan.

The situation with the three life forms describing herbaceous species is not entirely clear. They are groupings which cluster around the prominence of plant organs, i.e. the possession of conspicuous flowers or large leaves with no woody stem, or habit (in the botanical sense, that is, characteristic form of growth, particularly for graminoid plants). Few herbaceous types have economic uses or are distinguished with names, and a certain degree of overlap may be present between classes, for example, 'leaves' and 'hay', or 'leaves' and 'flower', depending on the focus of discussion.

Graminoid plants in recent times have had two economic uses: a certain 'swamp' or lakeshore type (probably a sedge or bulrush) was used for a type of basketry, and since the introduction of domestic livestock, grasses and sedges have had importance as winter feed and pasturage.

'Yans/'yens ('leaves') seems to significant as a residue of small and inconspicuous plants, and ecologically to describe herbaceous ground cover or undergrowth. No named generics were unequivocally associated with this group. Luke Fowler told Harlan Smith in 1926 that dandelion (*Taraxacum officinale*) was **'yens**[4] . 'Flowers' are conspicuous in season, especially in environments like subalpine meadows or alpine tundra. The term applies both to the plant organ, as in the rose, which has flowers, but for the Gitksan, is not a "flower", and to what would be called in English 'wildflowers.' A few flower types have names. **Ihlee'em ts'ak̲** 'bleeding nose', comprises two unrelated genera, Indian paintbrush and red columbine (see Table 5-1 for listing of Gitksan, English and scientific names of plants), both of which have scarlet flowers and which are abundant in the Skeena. The name is probably an allusion to the flower colour. The flowers of the columbine are commonly sucked for nectar by children. It is probably the perceptual salience of these forms because of their brilliant colour which causes them to be named; symbolic significance is also possible. Another generic which may be a 'flower' is **x̲sneenauntwxt**, which is composed of two common white flowered species of similar stature, pearly everlasting and yarrow. Pearly everlasting was used for grave offerings, at least in recent times, and yarrow is medicinal. The two peavine species (*Lathrys nevadensis* and *L. ochroleucus*), common understory herbs with vivid purple or cream flowers, are a third possible 'flower' generic. They are lumped by the Gitksan as **hagimgasxw**, 'wiping plant', named for their use in wiping the slime off salmon skin during fish processing. In the 1925 and 1926 Harlan Smith collected names for various plants we would call wildflowers, including in addition to those mentioned above mountain avens, sweet cicely, goatsbeard, and others. The names in general are either descriptive of uses ('wiping plant' for peavine) or are coordinate ('resembling spreading dogbane' for goatsbeard and sweet cicely). In addition, there were five species simply called 'flowers' or, interestingly 'flower plant' (Table 5-3), and a number of types which had no names (Table 5-8).

The prototypes of the two most economically important life forms, trees **gan**, and berries **maa'y**, are named 'real or true': **simgan** 'real tree or wood', the red cedar, and **simmaa'y** 'real or true berry', the black huckleberry.

The life-form affiliation of a number of taxa, including several important species, remains unclear (Table 5-4). Distinctive, important, and widespread plants such as devil's club are included in this 'unaffiliated' group. Whether, for example, its unique morphology and impressive spininess, actually create a unique and unaffiliated position, or whether its singularity and salience simply make reference to a life-form grouping unnecessary because of its very familiarity, remains unclear, although as of this writing, the latter seems more likely.

Several other plants which are large fleshy herbs whose roots, rhizomes or underground parts are used are also in this 'unaffiliated' grouping, including yellow pond lily, an important medicinal plant, and cow parsnip, important both for medicinal roots and for its edible stems.

In 1996 I conducted several interviews to address the issue of classification of these ambiguous plants, and the nature or meaning of the term **sgan**. When I asked the most elderly and fluent consultant I interviewed in 1996 whether one could say **sgan** ________ for several plants of ambiguous affiliation, she appeared to find the question odd, and simply repeated the plant names without **sgan**, confirming that in ordinary speech there are a series of plants with which one cannot generally substitute **sgan** + name for the name itself (O. Ryan 9/10/96 and 9/20/96.)

A second consultant, the daughter of the elder mentioned above, felt that none of the plants on my list of 12 forms[5] could be called **sgan**_______. For her, the word **sgan** carries connotations of the annual cycle and the bearing of fruit, rather than necessarily a sense of stature (J. Ryan 9/10/96.) The aquatic habit of yellow pond lily gave one consultant some hesitation, and she indicate that for her **sgan** carries a terrestrial and upright connotation, usually with woody or distinct stems (B. Anderson 9/7/96). Familiarity was suggested by one consultant as the reason that devil's club, rice-root lily and fireweed were not generally referred to as **sgan** (Art Mathews Jr 9/15/96.) Another consultant used appropriate Gitksan questions to elucidate the affiliation of various plants (S. Howard notes 9/14/96). Her response suggests that, depending on stature, one could ask :

Gwilx la gan de tun? What kind of tree is this?

Sgan gwi tun? What kind of a plant is this?

Gwilx la 'yens si tun? What kind of 'leaves' is this?

She indicated that for her **x̲hlaahl**, **gasx̲**, and **ha’mook̲** are **sgan**. Art Mathews Jr. indicated a possible ecological slant: if one wanted to talk about a bear walking through cow parsnip, one would say that the bear is in the **sganha’mook̲** (transcript 9/15/96.)

Some of the terms on my initial list seem to fit into the broader classification scheme with more or less ease, such as red osier dogwood and Sitka valerian. Others, as suggested above, probably are grouped with **sgan**, but are highly salient and important plants, as well as somewhat distinctive in morphology. A last grouping includes unusual plants such as the emergent aquatics yellow pond lily and water arum, the fleshy leaved stonecrop, and low growing herbaceous plants such as Queen’s cup, which may in fact be unaffiliated, or not members of **sgan**. Queen’s cup may be a berry, or perhaps a ‘leaf’ or a ‘flower,’ but in the absence of evidence which indicates how it is perceived by Gitksan people, I prefer to consider it and other ambiguous forms unaffiliated.

Intermediates

Below the “life-form” level, one can distinguish a jumble of covert groupings and isolated generics, which may or may not be included in any superordinate classes below the general concept “plant kingdom” or “floral form.” Several such groupings are suggested in Table 5-5. Some covert groupings seem to be cross-cutting, as indicated by the fact that evergreen conifers are found in both the ‘**sgan**’ and ‘**gan**’ groupings. Similar patterns of relationship of intermediate groupings to “life forms” are found among the Sierra Nahuatl (Taller de Tradicíon Oral and Beaucage 1987.) Other small clusters may be indicated by coordinate naming patterns, such as the horsetails, or the aquatic grouping formed by yellow pond lily and wild calla (Figure 5-2). These clusters of plants have distinctive habits, and, in the case of the pond lily group, habitat.

By the criteria employed by Taylor (1990) evergreen coniferous trees would be considered to be a covert intermediate grouping. This is indicated by the term **lax̲s**, which means conifer bough. This terms applies to trees such as spruce, and also to the low shrubby common juniper, included in the ‘plant’ life form. The term ‘cone’ **meek̲** might yield a different grouping, as it applies to the cones of any coniferous species, and also to the cone-like woody female catkins of the alders (commonly called ‘cone’ in

English as well); however, I think that modern Gitksan speakers do not group alder with evergreen conifers, despite the superficial similarity of the reproductive structure, as, indeed modern English speakers also do not consider them of a group.

The three Linnean species of alder, grouped in two indigenous generics, are perceived as similar (Figure 5-3). Both possess the distinctive alder 'cones' (**meek̲**). Similarly, the linguistic confusion (at least in English) between 'red willow' and 'yellow willow' or simply willow, indicates a possible grouping comprised of *Salix* species and *Cornus stolonifera*. The overlap of their uses in basketry[6] as well as similarity of habitat and growth from of shrubby willows with red osier may be the basis for this grouping.

Three generics of fern are also perceived as similar based on distinctive plant habit (Figure 5-4). These are **ax̲**, 'edible fern root' *Dryopteris expansa* in part, **damtx** 'inedible fern root', which includes *Dryopteris expansa* with small rhizomes, *Athyrium filix-femina*, and *Dryopteris felix-mas*, and **hap' iba'a**, bracken fern *Pteridium aquilinum*. They are distinguished, perhaps, because only **ax̲** has an edible rhizome, which was formerly an important winter carbohydrate food.

"Clubmosses" may perhaps be considered an intermediate grouping. Four botanical species of clubmoss are all designated **belena 'watsx̲**(E)/ **'wetsx̲**(W). Perhaps allied to these would be the fir clubmoss, *Huperzia selago*, considered by one consultant to be similar to the elusive taxon **x̲aadax̲**. However, another consultant considered this clubmoss to be an aberrant member of **umhlw**, 'moss', which happens to have its several branches come together to form a single stem at the base, with a root apparent below.

A grouping of inedible berries, called in English "bear's berries" **maa'ya smex**, includes the Gitksan generics **maa'ytwhl smex** ('bear's berries') **maa'ya smex** (also 'bear's berries') and **x̲sduu'lixs** ('teardrops')(Figure 5-5). **Maa'ytwhl smex** is a medicinal plant, wild sarsaparilla, *Aralia nudicaulis*. which has dark berries. **X̲sduu'lixs** is a sort of catch-all for red-fruited large leaved herbs with leafy stems, and has no use, though the species are relatively common and conspicuous. **Maa'ya smex** includes several other species with inedible berries, such as *Clintonia uniflora* and some of the species that also can be called **xsduu'lixs**. *Smilacina ?stellata*, called **hissgank̲'ots** or resembling large false solomon's seal is included in the intermediate "bear's berries" by Art Mathews, who writes, "This berry is one of the bear berries." (Mathews n.d.)

A last possible covert grouping includes the several lichen forms named by the Gitksan. These aberrant, morphologically and ecologically unique forms are sometimes lumped by ecologists with bryophytes, as "bryoids". Taxonomic botanists emphasize their connection with fungi, which provide the gross morphology of lichen "species". The Gitksan appear not to connect the arboreal 'tree hair' or 'tree fur' and 'frog blankets' (lungwort, *Lobaria* spp.) types with any other types of plants[7] .

Generics

There are a number of 'kinds' of plants recognized and named by the Gitksan (Table 5-1). These are generics in the sense of Berlin (1992) and other authors, or basic kinds in the sense of Taylor (1990). All of the local tree species (in the English sense) and the majority of woody shrubs are distinguished and named by the Gitksan. Likewise, most types of plants, whether shrubs or herbs, which have edible berries, are named. A number of herbaceous or low-growing perennials are also named and recognized.

The correspondence between species recognized in scientific taxonomy and the generics recognized and named by the Gitksan is variable (Figures 5-6, 5-7 and 5-8). For tree species, and the recognized edible species of the berry group, the correspondence seems to be one to one.[8] The two species of true fir, for example, *Abies lasiocarpa*(far the most common in Gitksan territory) and *A. amabilis* were given two different names by Jeff Harris Sr., who said in English that amabilis fir was a different type of 'balsam' (the local common name of *Abies*). In other cases, a Gitksan generic may encompass two or more separate species recognized by scientific taxonomy; these may be distantly related from the perspective of scientific botany, with members drawn from different botanical families. The uniting of two botanical species of juniper, *Juniperus communis*, a prostrate shrub, and *J. scopulorum*, a slow-growing tree, often with multiple stems, as **la̱x̱sa la̱x̱noḵ** is an example of two related species united as one generic. Two other pairs of scientific species united as single generics are the herbaceous flowering generics **ihlee'em ts'ak** 'bleeding nose', and **x̱sneenauntwxt** . 'Bleeding nose' denotes red columbine (*Aquilegia formosa* in the Ranunculaceae), and Indian paintbrush, (*Castilleja miniata* in the

Scrophulariaceae), two species placed by scientific taxonomy in different plant families, which share the feature of striking scarlet flowers. The nectaries of the first are sucked by children, while the paintbrush may have been used medicinally in the past[9] (Smith n.d.:181). **X̱sneenauntwxt** comprises yarrow, *Achillea millaefolium*, and pearly everlasting, *Anaphalis margaritacea*, two common white flowered herbaceous plants about 35 cm high, in different subfamilies of the Asteraceae. Here the uses of the two subtypes are also differentiated, with yarrow being medicinal, and everlasting having been used for grave offerings. **Damtx**, inedible fern root, is clearly defined by an economic character, lack of harvestable rhizomes. It comprises two Linnean species and part of a third (see Table 5-1) and is differentiated from **ax̱** , edible fern root, part of *Dryopteris expansa*. Other characters (whether leaves are clustered or dispersed on rhizomes, general size and texture of leaves) differentiate it from bracken, **hap'iba'a**.[10] Another generic defined by disutility is **xsduu'lixs**, a group of inedible fruits (Figure 5-7). **Xsduu'lixs** ('tears'), are red fruited large leaved herbaceous plants of approximately 30 cm height with leafy stems. The scientific genera include monocotyledonous forms of the lily family (*Streptopus* and *Disporum*), and the poisonous buttercup family *Actaea*. Another liliaceous herb of very similar appearance to *Disporum* and *Streptopus*, but with edible fruit, *Smilacina racemosa*, is called **ḵ'ots**.[11]

The exact boundaries of generics may be rather fuzzy, making it a judgment call whether a given cluster of forms is one generic with a prototype and various satellite types of variable distance from the center (cf Berlin 1992), or an intermediate composed of a focal type and a cluster of other generics related by coordination (cf Hunn and French 1984). The naming and recognition of smaller and less perceptually salient plants is more variable than that of large, salient species like the common tree species, important berry plants, or significant shrubs. In particular, I noted variability in the referents of **maawin** 'scouring rush', and **hismaawintxw**. All apply to species of *Equisetum*, both of 'horsetail' and 'scouring rush' form. For one informant, both the northern scouring rush *Equisetum hyemale*, and the meadow horsetail, *E. pratense*, were **maawin**, the prototype of this group, while common horsetail, *E. arvense*, and the small scouring rush, *E. scirpoides*, were peripheral, being designated by

hismaawintxw. For other informants, *E. hyemale* and the woodland horsetail *E. sylvaticum* were also designated by **hismaawintxw**.

Three distinct species of clubmoss (*Lycopodium* species) are designated by "otter belt" **belena 'watsx̲** by modern consultants (see Table 5-1). A fourth species was reported by Smith in 1926 to have been called "otter belt" (Smith n.d.:54-55). This tidy picture is obscured, however, when we look further at Smith's data (Smith n.d.:122), where we find that a buttercup, *Ranunculus abortivus*, is also designated by that term. Two other local clubmosses which grow in montane and alpine situations, *Huperzia selago* and *Lycopodium sitchense*), are not called **belena 'watsx̲**.

Binomial names in the classic sense, are extremely rare. Names which consist of two words are usually of the sort ________'s berry, 'good or good for ________' or 'real ________', where the second term is a life form term and the prototypical species is so designated. The one documented binomial which is a secondary lexeme is the word for parsnip, 'white carrots', and is obviously a recent term. I elicited similar terms for colour phases of foxes which I think were loan translations or descriptions.

Deciding exactly how many generics exist in the Gitksan classification system is methodologically complex. Because there are six modern occupied villages, and two previously somewhat distinctive northern villages, there is considerable dialectical variation. This affects plant names. One species, the swamp currant, is given the name **hlit'** in the western village of Gitwingax̲; a completely unrelated name is applied to the shrub by an elder from the eastern village of Gisbayakws whose ancestors came from the northern village of G̲aldo'o. The latter term was reported from G̲aldo'o in 1926. Should these be tallied as one generic or two?

Synonymy is sometimes obvious. In these cases it seems that the underlying concept is constant, but two distinct different names may be applied, as in the two names for western red cedar, **simgan** 'real wood or tree', and **amhat'al** 'good for cedarbark'. Likewise, for several tree species, the tree can either be called **am**________, or simply by the term itself, as in **amgiikw** or **giikw**, both of which mean hemlock, and which can be used interchangeably.[12] In these instances, I would count the pair of names as signifying one generic. A third set of synonyms is recognized by informants as being two alternate names for the same plant such as **'miigunt** and **'miidoots** for wild strawberry, or **mihlw** and **diux** for 'birch fungus'. These also seem to clearly represent one generic. Sometimes similar terms are used interchangeably, such as **lax̱sa lax̱noḵ** and **sg̱annax̱noḵ** ('boughs of the supernatural' and 'supernatural plant', both referring to juniper.) These I also count as true synonyms, both representing one underlying generic.

It is more problematic where different consultants have given different terms for the same botanical species, and do not appear to know other names, as in the three distinct names collected for the botanical species *Clintonia uniflora* or the two names for *Symphoricarpos albus*. If one were tallying the number of botanical species recognized and named by Gitksan people, these clearly would be counted as synonyms, and only one generic would be counted. Similarly, in the botanical lexicon of each informant, only one generic is represented, so perhaps even if one is striving to represent indigenous concepts only one generic should be tallied. However, if one were counting names, clearly multiple names co-exist, and it is not clear that informants count them as synonyms.

Another problem area exists when two Gitksan terms appear to apply to the same botanical species, but not to be identical in meaning. **Lax̱sa lax̱noḵ/sg̱annax̱noḵ** was given above for juniper. An unrelated term, **ts'ex̱**, is also glossed as 'juniper'. However, there is evidence that, for at least some informants, **ts'ex̱** and **lax̱sa lax̱noḵ** may represent different ecotypes, and that only the latter is 'supernatural' and spiritually powerful in medicinal contexts (Tribal Convention Notes October 16, 1986). Other consultants appear to lump all juniper as **lax̱sa lax̱noḵ**. Should these be considered two generics? One generic with two species? One generic with three synonyms? Another case where two related forms appear to designate different portions of the named entity is with **'waasan** and **am'waasan**. **'Waasan** 'willow' is the usual term, and applies broadly to shrubby or tree *Salix* species;[13] the consultant Jeff Harris Sr. who provided the term **am'waasan** apparently meant to contrast large, lowland tree-sized willows from shrubby species we encountered on a forested mountain slope. The tree sized willows have economic value for their tough and durable inner bark, used for tying and lashing. Shrubby willows are not utilized. Are these one generic with two species? Or two generics? I would best regard them as prototype and extension of one broad generic.

A third area of uncertainty is whether the terms postulated for 'empty' life forms are also generic concepts. There has been quite a bit of discussion of this issue in the recent literature (Berlin 1992; Atran 1990). Berlin rejects monogeneric life forms, and the idea that the same term can contrast both at the life form and at the generic level (1992:175); he prefers to think of these as unaffiliated generics. There is also the discussion of whether these are properly taxa, or simply the name of a residuum. I have tallied **majagalee** 'flower', **habasxw** 'grass', **umhlxw**, 'moss', and **gayda ts'uuts'** 'mushroom, fungus' as generics as well as life forms, because they are used in conversation to designate specific plants, contrasting with other (botanically) more restricted names at the generic level. However, I am uncertain if **'yans/'yens** can be considered a generic rather than an ecological term, and the term for a residuum.

Reviewing the Gitksan terms on Table 5-1, Gitksan Generics, there are 84 clearly distinct generics. When synonyms are reviewed to see if the concept apparently named is identical, that is, if the different consultants who gave the names would likely recognize the named entities as the same, five more distinct generics can be counted, for a total of eighty-nine. Two forms may be subgeneric categories, (**gadimis**, the black fruited form of the black huckleberry, which is contrasted with **simmaa'y** proper, the golden brown, large succulent fruited form), and **'waasan/'waasen**, which appears to represent either the total category 'willow', or the non-prototypical upland forms), and several forms appear to describe ecological variants which might also be subgeneric categories (**hluugan**, timberline mountain hemlock; **habaasxum t'ax̲**, "lake grass", cattail, sedge and bullrush; and **umhlxum miinhl gan** and **umhlxum 'yip**, moss under trees and on soil, respectively). Of these 89 types (excluding the subgeneric and ecological types), 83 represent vascular plants and 6 represent mosses, fungi and lichens. This is not an exhaustive list of Gitksan floral terms; a few terms have been omitted from the potential list because their referents were not identified, and the terms were from secondary sources. Neither have I included terms elicited by Smith in the 1920's in my tally.

The fuzzy boundaries of the poorly differentiated less salient taxa makes exact determination of the proportion of the flora named difficult. If the more difficult and less salient fungi and mosses are eliminated, it becomes somewhat more manageable to compare the boundaries of indigenous taxa with those of botanical taxa and to arrive at a rough proportion of the total vascular flora named. However, general "catchall" terms like **majag̱alee**, 'flower', and **habasxw** 'grass or hay' still make closure difficult. Excluding these problematic terms, the eighty-six Gitksan vascular plant generics designate at least 101 different botanical species. The majority of these generics designate one biological species, but some forms encompass two or more distantly related forms. In most instances, different members of the same botanical genus present in the local flora are classified as distinct Gitksan generics; this particularly applies to woody plants. Many herbaceous plants are not differentiated, but are unnamed or subsumed in broad categories such as the mentioned two above.

A final area of difficulty is the degree of uniformity of cultural knowledge of plants; clearly, in all societies, some people know more about a given area of cultural knowledge than others. For most of the names recorded in Table 5-1, at least two consultants confirmed the validity and referent of the term; usually this was two living consultants, but in a few cases, living elders confirmed or offered terms recorded by Smith in 1925-26. In a minority of instances, only one consultant provided the name. In these instances, a few especially knowledgeable people knew the names and uses of plants no longer remembered by others. These elders were recognized in the community as the people to consult about unusual or difficult plants or terms. Sixteen terms given in Table 5-1 were provided by these elders.[14] Where one is dealing with a small speech community and memory ethnography, the possibility of idiosyncratic terms or referents cannot be ruled out, but I have chosen to accept them as valid names and count them as part of the Gitksan botanical lexicon.

Naming

Gitksan plant names fall into several groups. Some names are simple, unanalysable lexemes such as **seeḵs**, 'spruce', which signify only the plant in question. Other names may be descriptive, indicate utility, be metaphoric, or refer to animals or to legend. Plant names may also refer to other plant species in coordinate fashion. Some names are also evidently borrowed from other languages. Two names of important economic plants, spiny woodfern and yellow pondlily, have an Athapaskan origin (Gottesfeld 1993). A third term, **ts'ex̱**, is shared with Witsuwit'en and Sekani.

Plant names may reflect utility, such as **am'mel**, 'good for canoe', the name for black cottonwood. One of the two alder taxa, **amluux**, means 'good for neckring' and refers to the red dye which can be made from alder bark, which was used to dye cedarbark red for ceremonial items such as Secret Society neckrings. The other alder, **giist**, does not have bark which can be used for red dye. One of the names of western red cedar, **amh'a'tal**, means 'good for cedar bark', one of the main uses of the cedar tree. Names of the **am**__________ form apply only to trees. The name for western yew, *Taxus brevifolia*, is **haxwdakw**, 'bow plant',[15] because of its dense, hard, springy wood, ideally suited to bow construction. Sometimes sapling sized Rocky mountain juniper, *Juniperus scopulorum*, is also called **sganhaxwdakw**, 'bow plant,' because it too was utilized for bow construction. Perhaps allied in concept to utility are the names of the juniper, 'boughs of the supernatural', or 'supernatural plant'. Juniper can be used for smudges, as well as having other medicinal uses.

Descriptive plant names may indicate form or colour. **Maa'y hagwilhuxw** 'rope-berry' is the term for strawberry bramble, a trailing vine with small tart fruit. **Maa'ya gaaḵ**, 'crowberry' is the word for black twinberry, which has inedible glossy purple-black fruit. **G̱esgsan**, 'tree hair' and **ligimtxgan**, 'tree-fur', referring to black hairlike arboreal lichens, are also clearly named descriptively. The name for soapberry, **is**, means 'urine', and refers to the foam which develops as the soapberry whip **yal'is** is prepared, which resembles that which develops when a person urinates on the ground. One of the names for birch fungus, **mihlxw**, refers particularly to the appearance of cinder conk, *Inonotus obliquus*, and means 'charred.' The term for the rootstock of *Veratrum viride*, **malgwasxw**, means 'something burnt'. I am uncertain if this refers to the dark colour of the dried rhizome, or to the fact that the rhizomes are commonly burned for purification.

Inedible berries may be named by reference to animals, as in in 'crowberry' above, and the various fruits grouped as 'bear's berries', **maa'ytwhl smex**.[16] Names of inedible or unused plants may also be metaphoric or refer to legends. *Clintonia uniflora*, Queen's cup, an understory lily which has a single inedible blue berry, has been called

hoobixs 'wiigat, 'Wiget's spoon', a reference to a story in which the legendary trickster/creator figure uses the spatulate leaves as a spoon[17] ; **maa'yhl litsxw**, 'blue grouse's berry'; and **maaya smex**, 'bear's berry'. The inedible and unusual appearing white fruited snowberry is called **sgantya'ytxw** (E), which means 'thunder plant', or **maa'ya luulak̲'**(W), 'ghost berry'. The names for mushroom, 'bird hat or penis' **gayda ts'uuts'**, and puffball, **masxwa luulak̲'**, 'ghost fart' are metaphoric descriptions. The picturesque name for the nodding onion is **ts'anksa gaak̲**, translates as 'raven's underarm-odour' (People of Ksan 1980). The name of the lichen species known in English as lungwort (*Lobaria pulmonaria* and *L. linita*) is **gwilalh ganaaw**, 'frog blankets', conveying the similarity in texture and appearance of the hydrated lichen thallus to the back of a frog or toad. This species was used medicinally. Two large herbs, *Angelica genuflexa,* and *Delphinium Brownii* are reported in Smith (n.d.) to be named 'frog parsnip'. These are plants which in some wise resemble the important edible and medicinal herb cow parsnip or 'wild rhubarb' **ha'mook̲**, but are smaller and not edible. In some sense, this is a type of coordinate naming (see below), naming by reference to another plant, as well as indicating lack of edibility by reference to an animal. However, the cloudberry *Rubus chamaemorus* (People of Ksan 1980), and/or possibly the dewberry, *Rubus pubescens* (Smith n.d.) and strawberry bramble, *Rubus pedatus*, which have been called **'miiganaa'w**, frogberry, may be an exception to the generalization that animal names signify inedibility. None of these types of berry is large or abundant, and the cloudberry grows in wetlands, which might be metaphorically associated with frogs, but they are edible and palatable berries.

Names may also be given in reference to other plants, as in the common practice of calling something **his**________,'resembling ___________,' as in **hissgant'imi'yt**, 'resembling kinnikinnik'. Table 5-6 shows five such present day names and ten collected by Smith in the 1920's. Three of Smith's terms are the same as terms collected in the 1980's and 1990's. I have interpreted these terms as coordinate (Hunn and French 1984), or as peripheral members of a loose grouping named in reference to a specific prototype, usually a plant which is either more salient or of higher utility. Some descriptive terms or 'resembling' names may be more spontaneous inventions and may not be stable names.[18] The temporal stability of such terms, or their use by consultants from different families or villages can serve as indications these terms can be taken as names.

Lending credence to the reality of '**his______**' names is the fact that not all plants are instantly dubbed with such terms; some plants are genuinely said to have no name. Often these are plants which have not been noticed by the consultant prior to questioning, although they certainly occur in the region. Table 5-7 lists thirteen plant species presented to Gitksan consultants which were not named. Harlan Smith (n.d.) reports a number of plants, usually small herbaceous forms, which were said to have no name (Table 5-8). Other plants are recognized by the consultant, but he or she cannot remember what it is called. These are considered to have names, although in some cases the name can no longer be recorded because no one recalls what it is.[19]

Subtypes of moss are called by their place of growth, as **umhlw minhl gan**, 'moss beneath the trees', or **umhlxum yip** 'moss-on-soil', differentiated from the prototypical **umhlw** which grows in swamps. A subtype of 'grass,' **habasxum t'ax̲**, is also named by habitat: it is "lake grass." I am not certain if these constitute true names or are simply spontaneous coinages, although the term **habasxum t'ax̲** for cattails was given by two different consultants.

Not included in Table 5-1 or subsequent tables are a handful of terms of recent origin which refer to cultivated plants. After the penetration of their territories by traders and missionaries, the Gitksan learned about and learned to cultivate common garden vegetables such as carrots, potatoes, turnips, cabbages, and rhubarb. The terms for these new plants are almost all borrowed from European languages, usually English, sometimes through Chinook jargon, the regional trade argot of the nineteenth and early twentieth centuries. These forms include **k̲'awts** (carrots), **sgusiit** (potatoes, from 'good seed'), **selali** (celery), **sganapils** (apple tree), **maaxwsxwa k̲'awts** (parsnip, 'white carrot'), and **kaabits** (cabbage). Turnips **k'inuu** has a different derivation, and lettuce is simply called **'yens**, 'leaves'.[20]

In contrast to other groups such as the Sahaptin (Hunn and French 1984) or the Tobelo (Taylor 1990:22), the Gitksan do not seem very concerned with whether a designation is a true name or just something a thing is called.[21] A core of terms is very stable, exhibiting little temporal or geographic variation. Another grouping exhibits only the generalized phonological variation between eastern and western dialects (indicated on Table 5-1 by (E) and (W)). Then there are terms which are more variable. Generally these refer to smaller, herbaceous plants which may be little or unutilized, though perhaps common or widespread, such as Queen's cup, discussed above, for which three distinct names were collected in the course of my fieldwork; one of the three terms, **hoobixs 'Wiiget** (W), was in use seventy years ago in Gitwingax when Harlan Smith did his field work.

Relationship of Plant Groupings to Utility and Plant Partons

The Gitksan have several terms which describe the parts of plants. These are listed in Table 5-9. Trees have wood (**gan**) and bark (**maas**). Coniferous trees, and the shrubby juniper species, have boughs/needles designated by **laxs**. In contrast, herbaceous plants and deciduous trees and shrubs have leaves, **'yens** (W)/**'yans** (E). Conifers have hard dry cones, **meek**; one deciduous tree genus, *Alnus*, also has fertile structures readily grouped with conifer cones. This woody pistillate catkin is also called **meek**. Fleshy fruits of angiosperms are called **maa'y**, 'berry'[22]. Ferns, horsetails and clubmosses contrast with other vascular plants because they lack any apparent fruits as they reproduce by spores[23] . Horsetails and clubmosses differ from angiosperms and ferns in having small simple needle like or rather obscure leaves, which can be called **laxs**.

Plants in general, both herbaceous and woody, have roots, which are called **wis**. Plants also have a plant body, designated at least for intermediate sized to small perennial plants by **sgan**. This term seems to connote stem or supporting structure (Compton *et al*, in press), though by extension, it includes the entire plant. There is also a word which specifies stem, **hlagandit**. Grasses, in contrast, lack large fleshy or woody roots, and lack (in general) obvious erect stems or broad, discrete leaves. The below-ground part of grasses may be referred to as **miinyip** or **miinhabasxw** 'under ground' or 'under grass.' Mosses contrast with other plants in lacking roots and stems, and having extremely small and simple leaves.

Plants, particularly angiospermous shrubs and herbs, may also possess flowers, **majagalee**. This term both signifies the plant organ (as a rose flower), and serves as a catchall term for plants which are not perceptually salient except for their flowers. Flower here is intended in the folk sense of a relatively large, brightly coloured, often scented, reproductive organ or infloresence, and does not include the infloresences of grasses or sedges, nor the catkins of trees and shrubs in the Salicaceae and Betulaceae. The catkins of willows can be called **hla ushl 'waasen** (Mathews n.d.)

These terms define fundamental aspects of plant appearance and properties; by extension, presence or absence of parts influences the potential utility of plants. Trees, **g̲an**, are defined by wood (**g̲an**), a polysemous situation reported for the Montagnais (Clément 1995) and many other groups (Brown 1984, 1991). The utility of wood, for technology, construction and, important in a northern latitude, fuel, is significant, and pervasive. Trees also have **maas**, bark, and **wis**, large woody roots, which are used both for medicine and technology. A class of medicines whose main ingredients are barks of trees and large shrubs is **x̲haldowk̲umgan**, translated as 'wood medicine.' The edible inner bark **k̲'anix** of several tree species was important for food. In addition, trees form the predominant vegetative cover, aggregated as forest.

The loose 'plant' grouping, in contrast, is not tidily defined by partons. Plants do have a plant body, cf stem, **sg̲an**. This varies from woody perennial stems with well developed and usable bark (e.g. *Sambucus racemosa*) to weak and thin perennial or biennial stems and leaves (e.g. the various species of *Rubus*), to the prostrate stems and leaves of evergreen subshrubs (e.g. kinnikinnik, *Arctostaphylos uva-ursi*), or simply petioles and leaves and runners of perennial herbs such as bunchberry, *Cornus canadensis*. They also possess leaves, **'yens**, usually relatively large, and often possess fleshy edible (or sometimes inedible) fruits, **maa'y**. Both trees and "plants" have roots, **wis**, which may be useful for technology or medicine. I am uncertain if rhizomes such as those of the yellow pond lily are called **wis** along with true roots.[24]

The "berry" grouping, which is obviously defined by possession of (edible) fleshy fruits, "berries" (**maa'y**), overlaps substantially with the "plant" grouping. Berries are seen as a key identifying character of plants which are not trees; edibility or inedibility of the berries is of high cultural significance, given the paucity of other types of carbohydrate foods. Inedible "berry" types may be marginal to the grouping, and be more properly considered as "plants", **sg̲an**.

The residual groupings of herbaceous plants, **'yens** and **majagalee** are obviously defined by characteristic partons, prominent leaves with no woody stem, and conspicuous flowers, also without woody stem. However, they seem also to be defined by disutility.[25]

More problematic is the graminoid **habasxw** group. I am uncertain if **habasxw** can be said to derive from a plant part (c.f. dried grass-type leaves or hay), or whether it is just a word signifying hay or grass. The term also means 'covering' (Rigsby, personal communication 1996).[26] Rigsby feels the term carries more the sense of the graminoid growth form than of a specific plant structure. The group **umxhlw** is similar in that the group is simply called "moss", which is not a term for a part of a plant, but a type of plant or growth form. The type moss, however, is the economically important diaper moss from swamps.

Fungi in some sense resemble "leaves" and "flowers" in being a residuum, but the plant parton in this case is essentially the entire visible structure, which is the fungal fruiting body, either a fleshy mushroom or a woody bracket fungus or "conk". It differs from moss in that the group name does not refer to an economic type, but is a metaphoric descriptive term for a typical mushroom.

Discussion-Comparison with other Groups

The classification system of the Gitksan is similar to other ethnobotanical classifications of indigenous groups from northwestern North America (Compton 1993; Gottesfeld 1993; Hunn 1982, Hunn and French 1984; Johnson-Gottesfeld and Hargus in press; Turner 1974, 1987, 1989; Turner et al. 1990). The loose and overlapping "life forms" and the presence of berry plants, mosses and mushrooms along with grass, tree and shrub, or woody plant, seem typical.

The classification scheme presented by Compton (1993:455) for the Southern Tsimshian Kitasoo, as might be expected from the linguistic relationship of Southern Tsimshian and Gitksan, is similar to Figure 5-1 of this chapter, though the treatment of trees vs. shrubs and berry plants differs, and ecological[27] and linguistic differences are apparent According to his analysis, the Kitasoo have an unnamed 'plant' domain. "Life form" groupings listed by Compton include sχán,[28] a woody plant grouping which includes both trees and bushes. Within this are two groups, sχan ṁaʔı , berry/fruit bearing plants, and a second "bushes" category which includes some (inedible) berry bushes, and other shrubs and plants. Adjacent to sχán is a small group of articulated coralline algae, unnamed by Compton, said to be metaphorically allied to trees. Other groups include grasses and grass like plants, and, slightly overlapping this, 'flowers' mıdze ɢalɛ, and 'weeds' liksy̓ɛns, . 'Mushrooms', 'shelf fungi' and 'mosses and moss like plants' comprise three isolated groups. He also indicates, in common with Gitksan and many other classifications, unaffiliated generics, and two intermediate groupings, roots and rhizomes (both edible and medicinal or poisonous), and marine (non-coralline) algae.

The Gitksan schema is also similar to the Wet'suwet'en classification, an Athapaskan speaking group whose territory is just to the south and east of the Gitksan on the drainage of the Bulkley River (Gottesfeld 1993; Johnson-Gottesfeld and Hargus in press). The Wet'suwet'en also have woody plant/plant/berry/moss and mushroom groupings. Grasses may either be an empty life form, or possibly an intermediate grouping.

Another similarity among northwestern North American groupings is the relationship of "affiliation" (Turner 1989) or coordination (Hunn and French 1984) between taxa. This differs from the concept of hierarchical inclusion in that taxa of ostensibly the same level in the taxonomy are seen as somehow belonging together, or as being related to one another, without their being included in a superordinate grouping, or one being a kind of the other. In Gitksan, this kind of relationship is graphically coded by the use of ***his***__________ names, 'resembling__________,' where in Wet'suwet'en, such relationships are coded by terms like ________***yez*** 'little____', and in Thompson as ______'s root, or by kin terms '______'s friend/relative/cousin' or 'child of _______ ' (Turner 1989:85).

An area of resemblance between Gitksan taxonomy and that of a number of other groups is the use of animal or ghost/spirit terms to indicate disutility or inedibility. This phenomenon is widespread in northwestern North America, and has been specifically commented on by Gottesfeld/Johnson-Gottesfeld (1993 and Johnson-Gottesfeld and Hargus forthcoming) for the Wet'suwet'en. Compton (1993) has offered a very similar analysis of the phenomenon based on his data on Northern Wakashan languages and on Southern Tsimshian. Turner has also recorded the phenomenon for various indigenous groups in British Columbia (Turner *et al.* 1980; Turner *et al.* 1983; Turner *et al.* 1990.) Balée (1989) also describes both the use of animal and spirit terms to differentiate wild species from cultivated analogs for the Amazonian Ka'apor. The use of mythological terms (such as **hoobixs 'wiigat**, 'Wiget's spoon', or **'miits 'wiigat**, 'Wiget's berry') for the Gitksan may be similar to the use of corpse, ghost or spirit terms.

Summary and Conclusions

Gitksan plant classification differs from scientific taxonomy in being of shallow hierarchy, in having overlapping and at least partially utilitarian major plant groupings or "life forms", and in lack of focus on reproductive parts of plants to indicate true relationships. It is similar to other indigenous classification schemes documented for northwestern and northern North America. As in other documented ethnobotanical taxonomies in this region, vines are not a life form, whereas berry/fruit plants, mosses, and fungi are recognized life forms. In common with many other folk taxonomies, small and perceptually less salient forms such as mosses, fungi, lichens, and graminoid plants are underdifferentiated in comparison to Western scientific taxonomy (Atran 1985: 300; Berlin 1992:25, 60-61). This results in so called "empty life forms", which are taxonomically diverse groups (in scientific classification) of ecological importance and distinctive habit, but which contain few or no named subdivisions in the indigenous taxonomy (Turner 1974). The Gitksan classification system is not a unified abstract whole, but a mixture of partial classifications built for different purposes and using diverse criteria, prominently including utility. Utility, as Clément (1995) has pointed out, bears a relationship to plant partons, which create morphological differences between plant types that make them suitable for different uses. Symbolic, ecological, and morphological characters clearly also have a role in Gitksan plant classification.

Naming among the Gitksan includes the use of animal terms and mythological references to indicate disutility or inedibility. The naming of plants by reference to other plants, usually with the term **his-**, stands out, and recalls coordinate naming by the Sahaptin (Hunn and French 1984) and Wet'suwet'en (Gottesfeld 1993 and Johnson-Gottesfeld and Hargus forthcoming). Some names are also directly utilitarian ('good for canoe', 'wiping plant'). Unlike some groups, the Gitksan do not seem overly concerned with true names; more to the point is 'what they call it'. Many plants, especially herbaceous and weedy forms, are unnamed, and others are referred to in very broad "catch-all" categories. The few terms for cultivated plants (as one might anticipate), are apparent European borrowings. Binomial names in the classic sense, are extremely rare.

I would like to close with a brief consideration of emic views of classification. In the course of 1996 field work, two Gitksan speakers I worked with expressed discomfort with the whole orientation of this project. One consultant commented that it was difficult to render the meaning of the term **sgan** in English, that English terms like tree and shrub didn't really have the same connotation. She then tried to express how this term for her encompassed many aspects of the relationship of plants to the cycle of the year, to the bearing of fruit.

The second consultant expressed dissatisfaction with the way that English always wanted to divide things into boxes. She commented "Why do outside people have to put things in boxes–the way we think there's a time for all these [plants] and they're all linked together. These little plants have a purpose, to help the other ones grow" (S. Howard notes 9/14/96.) For her, the appropriate way to look at plants was to see them in relationship. She said:

> Life cycle–the cycle continues. Plants start growing, leaves open. Trees first. It feeds the animals. The cycle continues. Then salmon comes. In the fall are the animals. That's how the life cycle continues. There's a certain time for something which helps sustain the life of another being, and that's where the chain link comes in. You have to preserve the link. If you ever destroy that link, then the rest is destroyed (S. Howard 9/14/96.)

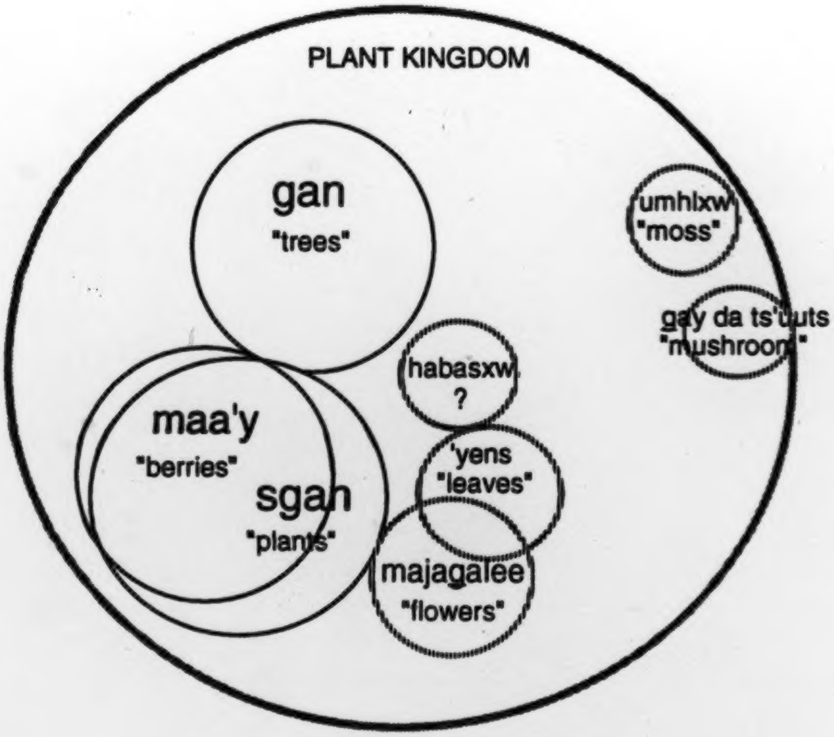
PLANT KINGDOM
gan
"trees"
umhlxw
"moss"
gay da ts'uuts
"mushroom"
habasxw
?
maa'y
"berries"
sgan
"plants"
'yens
"leaves"
majagalee
"flowers"

Figure 5-1 GITKSAN PLANT CLASSIFICATION
Schematic Relationships of Broad Plant Classes
Empty "life forms" shown with vertical dashed lines.
"Kingdom" shown with thick grey line.

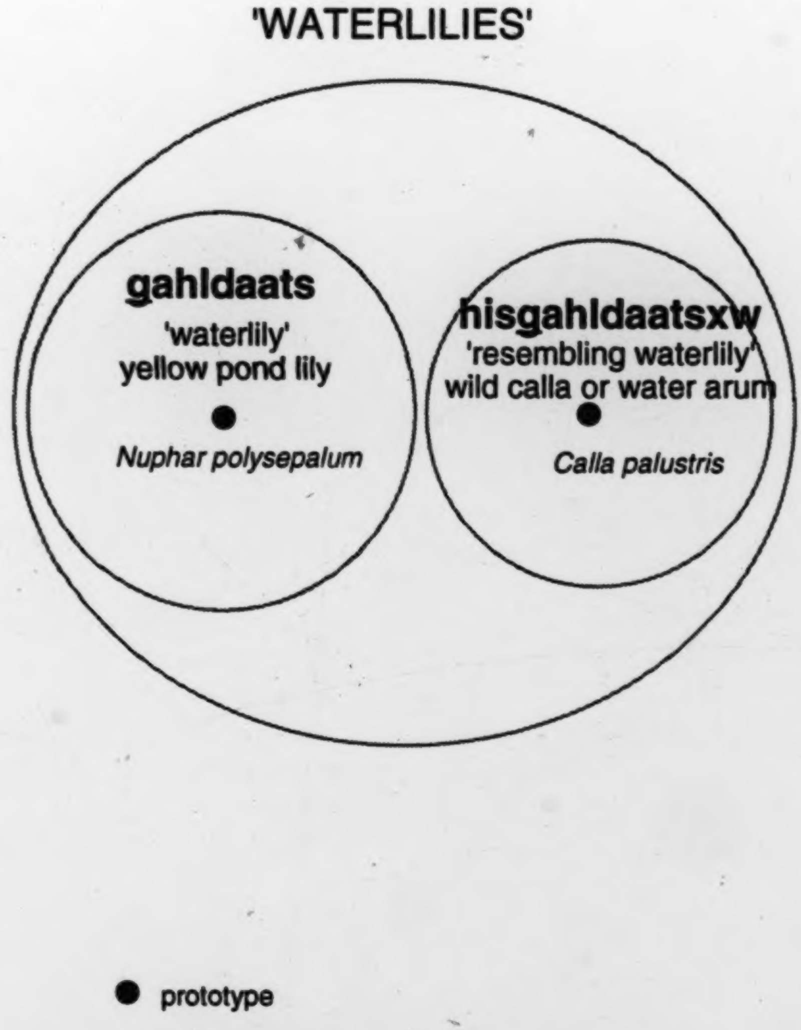
'WATERLILIES'
gahldaats
'waterlily'
yellow pond lily
Nuphar polysepalum
hisgahldaatsxw
'resembling waterlily'
wild calla or water arum
Calla palustris
● prototype

Figure 5-2 Coordinate Naming: waterlilies

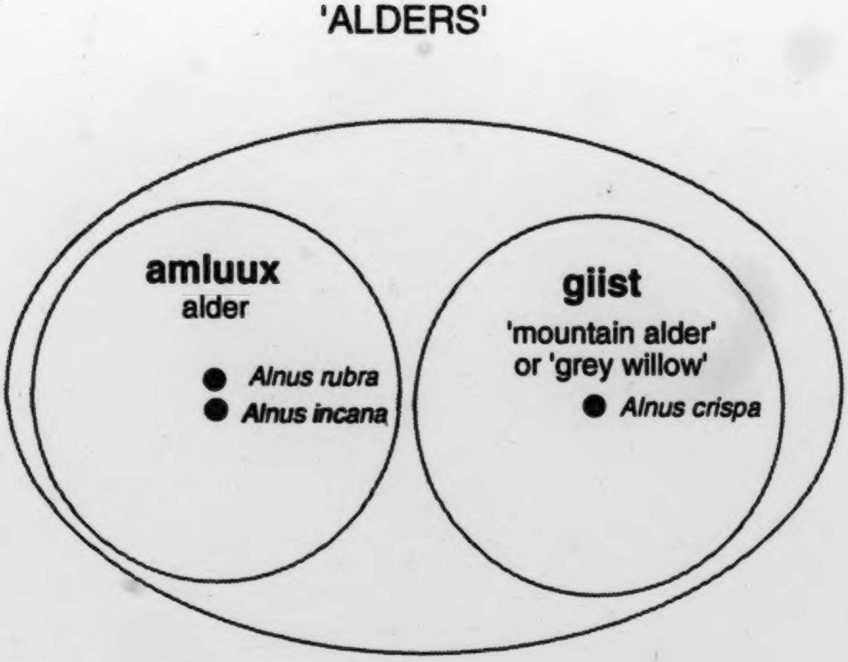
'ALDERS'
amluux
alder
Alnus rubra
Alnus incana
giist
'mountain alder'
or 'grey willow'
Alnus crispa

Figure 5-3 Distribution of scientific species of *Alnus* in relation to the two Gitksan generics within the postulated intermediate 'alder'.

● prototype

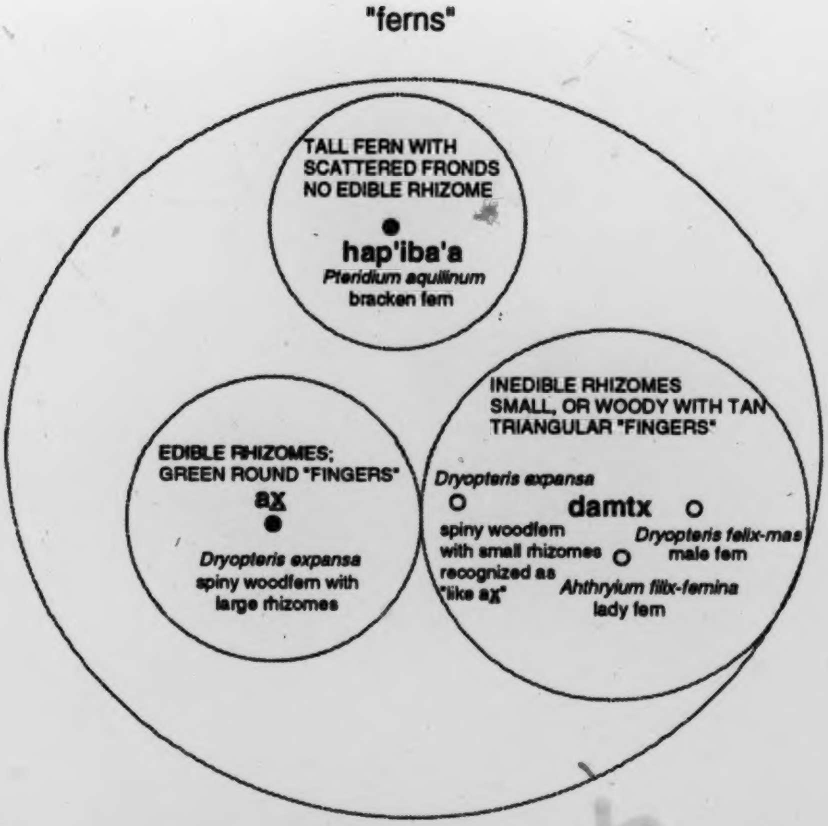
"ferns"
TALL FERN WITH
SCATTERED FRONDS
NO EDIBLE RHIZOME
hap'iba'a
Pteridium aquilinum
bracken fern
INEDIBLE RHIZOMES
SMALL, OR WOODY WITH TAN
TRIANGULAR "FINGERS"
EDIBLE RHIZOMES;
GREEN ROUND "FINGERS"
ax̲
Dryopteris expansa
spiny woodfern with
large rhizomes
Dryopteris expansa
damtx
spiny woodfern
with small rhizomes
recognized as
"like ax̲"
Dryopteris felix-mas
male fern
Ahthryium filix-femina
lady fern

Figure 5-4 "Fern" intermediate showing characters which differentiate the three Gitksan generics of fern

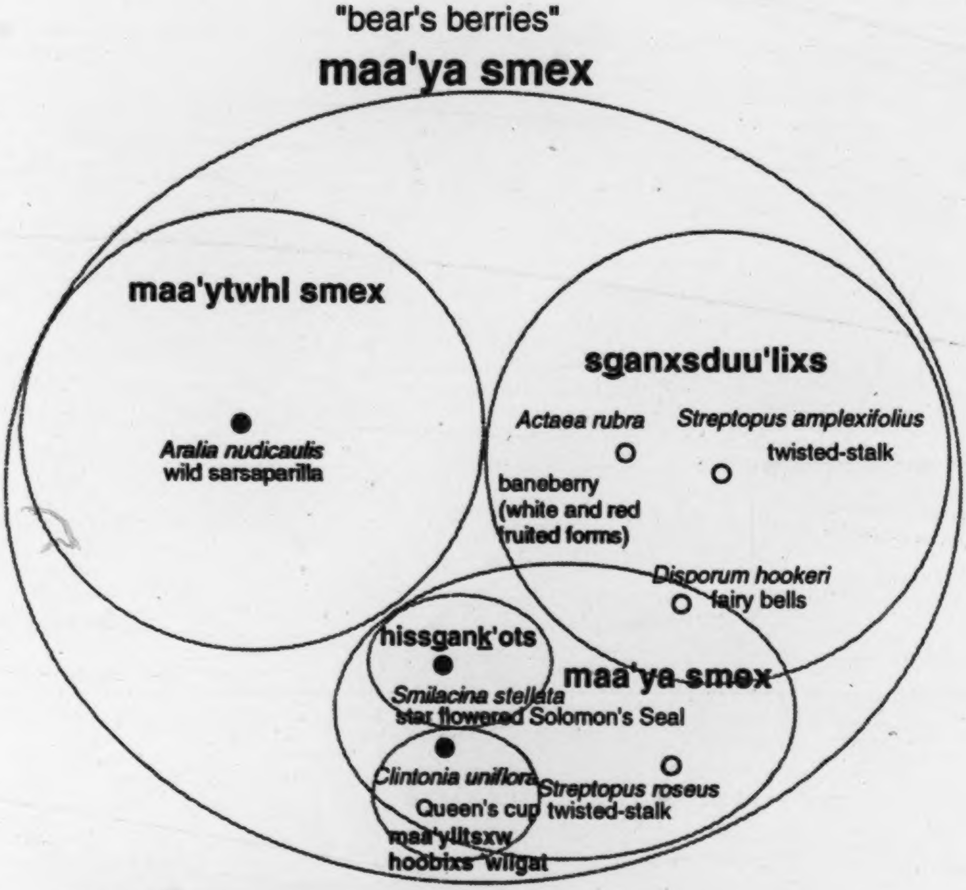
"bear's berries"
maa'ya smex
maa'ytwhl smex
Aralia nudicaulis
wild sarsaparilla
sganxsduu'lixs
Actaea rubra
baneberry
(white and red
fruited forms)
Streptopus amplexifolius
twisted-stalk
Disporum hookeri
fairy bells
hissgank'ots
Smilacina stellata
star flowered Solomon's Seal
maa'ya smex
Clintonia uniflora
Queen's cup
maa'yiltsxw
hoobixs wilgat
Streptopus roseus
twisted-stalk

Figure 5-5
The "bear's berries" intermediate grouping is a group of two generics of inedible fruits. **Maa'ytwhl smex**,whose name means "bear's berries", is medicinal. **Xsduu'lixs**, whose name refers to tears, is not. **Xsduu'lixs** does not seem to have a prototypic scientific species. A third grouping, called **maa'ya smex**, includes members of three named generics, and rosy twisted stalk. It may be an artifact caused by people referring to the botanical species within it by the intermediate group name, or it may constitute some kind of residuum for speakers who do not use the other generic names for the included forms.

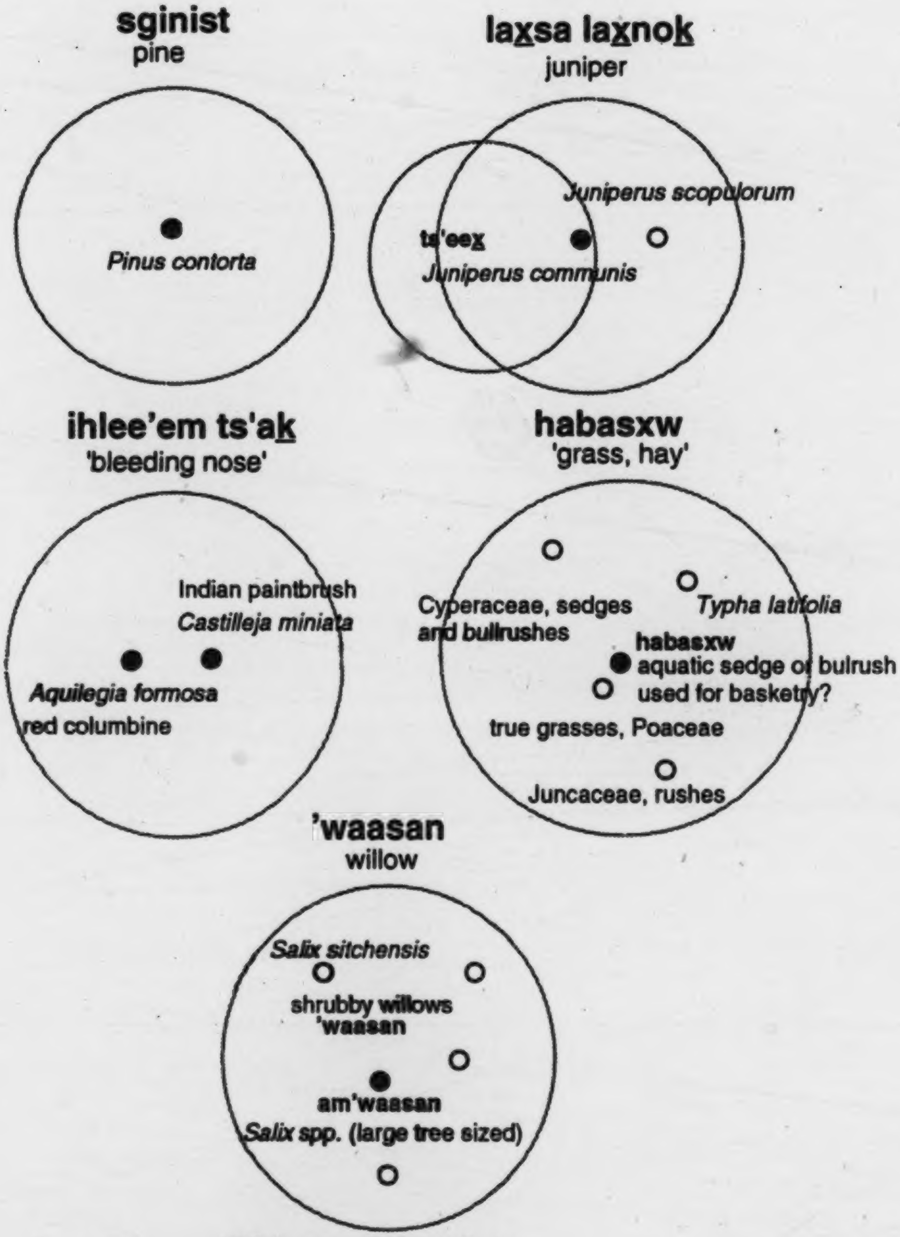
sginist
pine
Pinus contorta
laxsa laxnok
juniper
Juniperus scopulorum
ts'eex
Juniperus communis
ihlee'em ts'ak
'bleeding nose'
Indian paintbrush
Castilleja miniata
Aquilegia formosa
red columbine
habasxw
'grass, hay'
Cyperaceae, sedges
and bullrushes
Typha latifolia
habasxw
aquatic sedge or bulrush
used for basketry?
true grasses, Poaceae
Juncaceae, rushes
'waasan
willow
Salix sitchensis
shrubby willows
'waasan
am'waasan
Salix spp. (large tree sized)

Figure 5-6 **Gitksan Generics**

● prototype
○ non-prototypic scientific species or groups of species

sg̲anxsduu'lixs

"bear's berries"

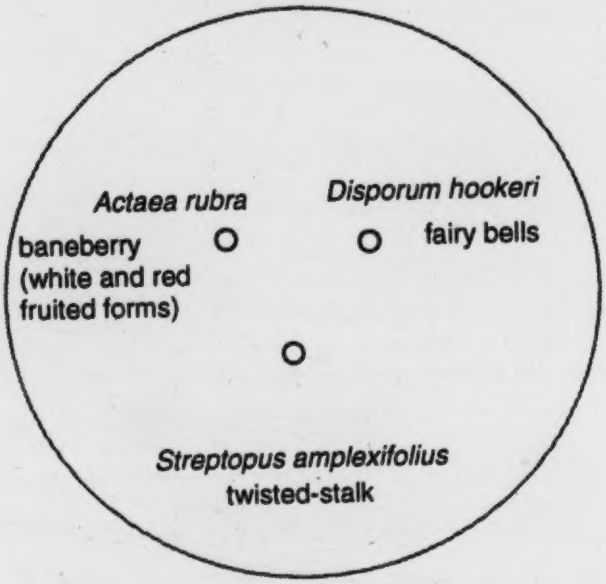
Actaea rubra
baneberry
(white and red
fruited forms)
Disporum hookeri
fairy bells
Streptopus amplexifolius
twisted-stalk

Figure 5-7

The inedible fruit generic **xsduu'lixs**, red fruited large leaved herbaceous plants of approximately 30 cm height with leafy stems. The scientific genera include monocotyledonous forms of the lily family (*Streptopus* and *Disporum*), and *Actaea rubra* , a poisonous member of the dicotyledonous buttercup family.

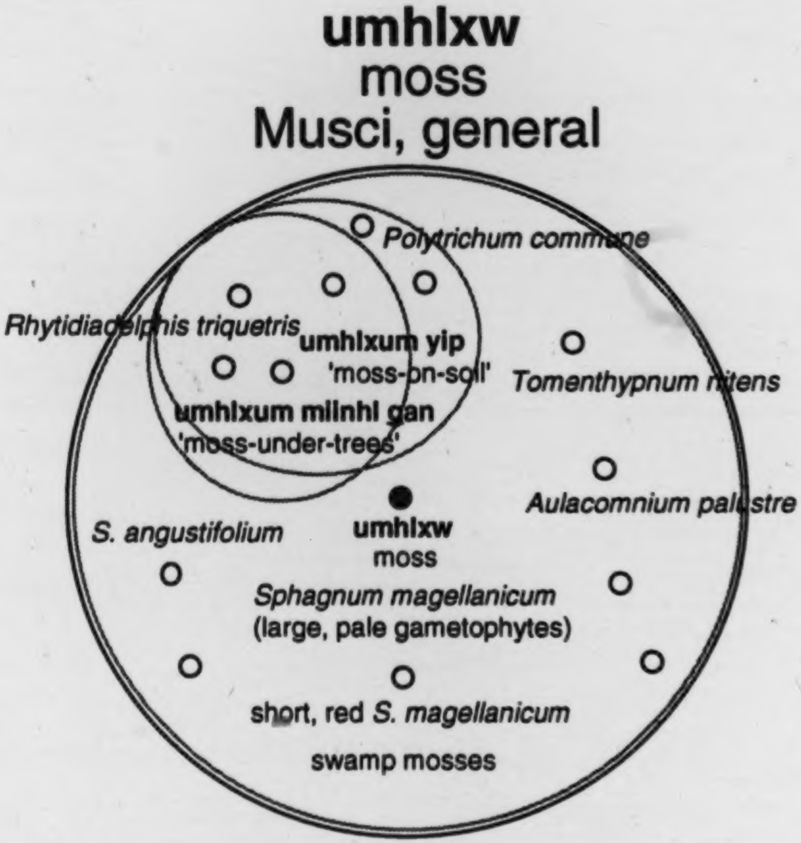
umhlxw
moss
Musci, general
Polytrichum commune
Rhytidiadelphis triquetris
umhlxum yip
'moss-on-soil'
Tomenthypnum nitens
umhlxum milnhl gan
'moss-under-trees'
Aulacomnium palustre
S. angustifolium
umhlxw
moss
Sphagnum magellanicum
(large, pale gametophytes)
short, red S. magellanicum
swamp mosses

Figure 5-8 SUBTYPES AND DISTRIBUTION OF SCIENTIFIC SPECIES WITHIN THE BOUNDS OF THE "LIFE FORM"/GENERIC **UMHLXW,** MOSS

● prototype

○ non-prototypic scientific species or groups of species

(many more scientific species of bryophytes than those indicated are included in the moss category; for clarity only representative types that have been identified by consultants are named here)

TABLE 5-1
GITKSAN GENERICS

Gitksan Generics	English name	Latin name(s)
amgiikw	western hemlock	*Tsuga heterophylla*
giikw	western hemlock	*Tsuga heterophylla*
amhaawak̲	paper birch	*Betula papyrifera*
haawak̲	paper birch	*Betula papyrifera*
amhat'a'l	western red cedar	*Thuja plicata*
amk̲'oox̲st	trembling aspen	*Populus tremuloides*
amluux	alder	*Alnus incana* and *A. rubra*
luux	alder	*Alnus incana and A. rubra*
am'mal (E)/am'mel (W)	black cottonwood	*Populus balsamifera* ssp. *trichocarpa*
amwaasaan	lowland willow trees	*Salix* spp.
'waasan (E) /'waasen (W)	willow	*Salix* spp.
ax̲	spiny woodfern	*Drypoteris expansa*
hig̲andihl ax̲	spiny woodfern plant (stem)	*Drypoteris expansa*
sg̲anax̲	spiny woodfern plant	*Drypoteris expansa*
bax̲bok̲' (E only)	dandelion	*Taraxacum officinale*
belena 'wetsx̲ (E)	clubmoss	*Lycopodium clavatum, L. annotinum, L. complanatum, L. dendroideum*
belena 'wetsx̲ (W)	clubmoss	*Lycopodium clavatum, L. annotinum, L. complanatum, L. dendroideum*
damtx (E)/demtx (W)	'inedible fern root'	*Athyrium filix femina, Drypteris felix-mas,* small *Dryopteris expansa*
dilawsa	northern gooseberry	*Ribes oxyacanthoides*
diuxw	'birch fungus'	*Inonotus obliquus* and *Fomes ignarius*
eluuts'ook̲', haluuts'ook̲'	chokecherry	*Prunus virginiana* var. *melanocarpa*
sg̲an'eluuts'ook̲	chokecherry bush or tree	*Prunus virginiana var. melanocarpa*
gaanaxws	a 'braided' looking moss or liverwort	[unknown]
g̲adimis	black huckleberry (black fruited)	*Vaccinium membranaceum*
g̲ahldaats	yellow pond lily	*Nuphar polysepalum*
g̲ale'e, k̲'ale'e	rose (hips)	*Rosa acicularis*
sg̲ank̲'ale'est (w)	rose bush	*Rosa acicularis*
gam	saskatoon	*Amelanchier alnifolia*
sg̲angam (E)	saskatoon bush	*Amelanchier alnifolia*
sg̲angem (W)	saskatoon bush	*Amelanchier alnifolia*
gapk̲'oyp	bunchberry	*Comus canadensis*
sg̲angapk̲'oyp	bunchberry plant	*Comus canadensis*
gaax̲	riceroot lily	*Fritillaria camschatcensis*
gayda ts'uuts	fungus, mushroom	basidiomycete and ascomycete fruiting bodies
geegan	'tree hair'	*Bryoria* spp.
gils/gilst	mountain alder	*Alnus crispa*
gwilahl g̲ana'w	lungwort, 'frog blankets'	*Lobaria pulmonaria* and *L.oregana*

TABLE 5-1
GITKSAN GENERICS

Gitksan Generics	English name	Latin name(s)
gwui iitxwit	large leaved avens, 'evergreen'	*Geum macrophyllum*
ha'mook̲	cow parsnip, 'wild rhubarb'	*Heracleum lanatum*
haast	fireweed	*Epilobium angustifolium*
hagimgaaxw	peavine, 'wild sweet peas'	*Lathrys nevadensis* and *L. ochroleucus*
hap'iba'a	bracken fern, tall fern	*Pteridium aquilinum*
habaaxw	grass, hay	graminoid plants; Poaceae, Cyperaceae, Typhaceae?
habaaxum t'ax̲	cattails, bullrush, sedge?	large graminoid plants in lakes *Typha latifolia, Scirpus* spp., *Carex* ?
haxwdakw (E)	yew and/or Rocky Mountain juniper	*Taxus brevifolia* and/or *Juniperus scopulorum*
sganhaxdakw (W)	yew and/or Rocky Mountain juniper	*Taxus brevifolia* and/or *Juniperus scopulorum*
hinak̲	skunk cabbage	*Lysichiton americanum*
hisg̲ahldaataxw	wild calla or water arum	*Calla palustris*
hisha'mook̲xwit	Northern rein orchid	*Platanthera hyperborea*
hismaawintxw	horsetails and scouring rushes	*Equisetum arvense, E. variegatum, E. hyemale, E. sylvaticum*
hisg̲amaawin	horsetails and scouring rushes	*E. arvense, E variegatum*
hisgank̲'ots	small false solomon's seal	*Smilacina stellata* and ?*trifoliata*
hisg̲ant'imi'yt	wintergreens and false box	*Chimaphila umbellata* ; *Pachystima myrsinites*
higuu g̲an	? timberline mountain hemlock	*Tsuga mertensiana* ? (stunted high elevation specimens)
hiit'	swamp currant	*Ribes lacustre*
hoo'oks/hoo'oxs	subalpine fir, 'balsam'	*Abies lasiocarpa*
hoobixs 'wiigat	Queen's cup or beadlily	*Clintonia uniflora*
hu'ums (E)/wa'umst (W)	devil's club	*Oplopanax horridum*
ihlee'em ts'ak̲	red columbine and Indian paintbrush	*Aquilegia formosa* and *Castilleja miniata*
is	soapberry	*Shepherdia canadensis*
sg̲an'is	soapberry bush	*Shepherdia canadensis*
isxum sg̲a'nisxw (E)	Sitka valerian; wild mint?	*Valeriana sitchensis; Mentha arvensis* ?
isxum sk̲'ooks (W)	Sitka valerian	*Valeriana sitchensis*
k̲'awts	'carrots'	*Daucus carrota; Lupinus* ?*nootkatensis*
k̲'oox̲st	Douglas maple	*Acer glabrum* var. *Douglassii*
k̲'ots	false Solomon's Seal	*Smilacina racemosa*
lax̲ss lax̲nok̲	juniper	*Juniperus communis* and*J. scopulorum*
sg̲annax̲nok̲	juniper	*Juniperus communis* and*J. scopulorum*
leek̲	spreading dogbane, 'nylon plant'	*Apocynum androsimaefolium*
sg̲anleek̲	spreading dogbane, 'nylon plant'	*Apocynum androsimaefolium*
ligimtxhl g̲an	'tree fur', 'black tree moss'	*Bryoria* spp.
loots'	red elderberry	*Sambucus racemosa*
maa'ya gaak̲	black twinberry, 'crowberry'	*Lonicera involucrata*
sg̲anmaa'yagaak̲	black twinberry bush	*Lonicera involucrata*

TABLE 5-1
GITKSAN GENERICS

Gitksan Generics	English name	Latin name(s)
maa'ya luulak̲'	snowberry,'ghostberry'	*Symphoricarpos albus*
maa'yhl litexw	Queen's cup or beadlily	*Clintonia uniflora*
maa'yim hagwilhuxw	strawberry bramble	*Rubus pedatus*
maa'ytxwhl smax (E) **maa'ytxwhl smex (W)**	wild sarsaparilla	*Aralia nudicaulis*
maawin	meadow horsetail	*Equisetum pratense*
majagalee	'flower'	residual taxon comprising herbaceous plants with conscpicuous flowers
maskwa luuluk (E) **'mesxwa luulak̲ (W)**	puffball	*Lycoperdon* spp. and perhaps others, such as *Bovista pila*
maa'y weigan	wild blue currants	*Ribes laxiflorum*
maa'ya ganaa'w	'frogberries'	*Rubus pubescens*
maa'ya smex	Queen's cup or beadlily	*Clintonia uniflora*
mihlxw	'charred', birch fungus	*Inonotus obliquus* and *Fomes ignarius*
milk̲'oox̲st/milk̲'oox̲s	salmonberry	*Rubus spectabilis*
milgan	highbush blueberry	*Vaccinium ovalifolium*
milgunt	wild strawberry	*Fragaria virginiana*
mildoots	wild strawberry	*Fragaria virginiana*
mil'oot	bog cranberry and perhaps lowbush cranberry	*Vaccinium oxycoccos* and perhaps *V. vitis-idaea*
milts'ook̲'	chokecherry	*Prunus virginiana* var *melanocarpa*
milkst	Pacific crabapple	*Malus fuscus*
sg̲anmilkst	Pacific crabapple tree	*Malus fuscus*
miyahl (E) **miyehl (W)**	lowbush blueberry	*Vaccinium caespitosum*
naasik'	raspberry	*Rubus idaeus*
nisk̲'o'o	thimbleberry	*Rubus parviflorus*
sdetxs	stinging nettle	*Urtica dioica*
seek̲s	spruce	*Picea engelmannii, P. glauca, P.* x *lutzii* , *P. mariana*
sg̲andax̲do'ohl	Labrador tea, 'swamp tea'	*Ledum groenlandicum*
sg̲ansa'angitl'	mountain ash	*Sorbus sitchensis* and *S. scopulina*
sg̲ants'ak' (E) **sg̲antsak' (W)**	beaked hazelnut	*Corylus cornuta*
sg̲ants'imwil'oo'o	swamp currant	*Ribes lacustre*
sg̲antya'ytxw	snowberry	*Symphoricarpos albus*
sg̲ananaw	pincherry	*Prunus pensylvanica*
sg̲ananax̲	black hawthorn, 'thornberry'	*Crataegus douglasii*

TABLE 5-1
GITKSAN GENERICS

Gitksan Generics	English name	Latin name(s)
sg̱ants'iks	Indian or False hellebore	*Veratrum viride*
malgwasxw (E)	the root of the Indian hellebore	the root of *Veratrum viride* '
melgwasxw (W)	the root of the Indian hellebore	the root of *Veratrum viride*
sginist	lodgepole pine	*Pinus contorta*
simg̱an	western red cedar	*Thuja plicata*
simmaa'y	black huckleberry	*Vaccinium membranaceum*
sbikst (W)	highbush cranberry	*Viburnum edule*
tiim laalax̱'u	Labrador tea, 'swamp tea'	*Ledum groenlandicum*
t'imi'yt	kinnikinnik	*Artostaphylos uva-ursi*
sg̱ant'imi'yt	kinnikinnik plant	*Artostaphylos uva-ursi*
t'ipyeest	stonecrop	*Sedum divergens*
ts'anksa g̱aaḵ	nodding onion	*Allium cernuum*
ts'eex̱	juniper (about knee to mid-thigh high)	*Juniperus communis* ? and*J. scopulorum*
ts'idipx̱s	highbush cranberry	*Viburnum edule*
sg̱antsidipx̱st	highbush cranberry bush	*Viburnum edule*
umhixum milnhl gan	moss underneath the trees	terrestrial forest floor Musci
umhixw	moss; diaper moss	*Sphagnum magellanicum* (long, pale growth form) and perhaps other spp.; Musci in ge
umhixum 'yip	moss-on-soil; terrestrial mosses	terrestrial Musci
wihl	yellow cedar	*Chamaecyparis nootkatensis*
x̱aadax̱	unknown spiky plant with three parts	
x̱hlaahl	red osier dogwood	*Cornus stolonifera*
xhle'e	amabilis fir	*Abies amabilis*
xsduu'iixs	baneberry, fairy bells and twisted stalk	*Disporum hookeri* , *Actaea rubra,Streptopus amplexifolius*
sg̱anxsduu'iixs	baneberry, fairy bells and twisted stalk	*Disporum hookeri, Actaea rubra,Streptopus amplexifolius*
x̱aneenauntwxt	yarrow and pearly everlasting	*Achillea millaefolium* and *Anaphilis margaritacea*
'yans (E)/'yens (W)	'leaves', herbaceous plants	

TABLE 5-2
'LIFE FORM' AFFILIATIONS OF GITKSAN GENERICS

'Trees'		'Plants'		'Berries'		'leaves'	
am'mal (E)	cottonwood	sg̲an nax̲nok	juniper	maa'ya g̲aak̲	black twinberry	ts'anksa g̲aak̲ (?)	nodding onion
am'mel (W)	cottonwood	sg̲anxsduu'lixs	'bear's berries'	maa'yhl litsxw	Queen's cup	'yans (E)	'leaves'
amk̲'oox̲st	aspen	sg̲andax̲do'ohl	Labrador tea	maa'yim hagwiluxw	strawberry bramble	'yens (W)	'leaves'
am'wasaan	willow tree	sg̲anmaa'yagaak̲	black twinberry	maa'ytxwhl smax (E)	'bear's berries'	sdatxs (?)	stinging nettle
amgiikw	hemlock	sg̲ansa'angitl'	mountain ash	maa'ytxwhl smex (W)	'bear's berries'		
amhaawak̲	birch	sg̲ant'imi'yt	kinnikinnik	maa'y weigan	blue currant		
haawak̲	birch	sg̲ants'ak' (E)	hazel bush	maa'ya ganaa'w	trailing raspberry		
amhat'a'l	red cedar	sg̲ants'imwil'oo'o	swamp currant	maa'ya smax	Queen's cup		
amluux	alder tree	sg̲antya'ytxw	snowberry bush	milk̲'oox̲st	salmonberry		
gilst (?)	mountain alder	sg̲an'ax̲	woodfern plant	mildoots	strawberry		
hoo'oks (W)	subalpine fir	sg̲an'aluuts'ook̲	chokecherry tree	milg̲an	highbush blueberry		
hoo'oxs (E)	subalpine fir	sg̲angam (E)	saskatoon bush	milgunt	strawberry		
hluugan	mountain hemlock	sg̲angem (W)	saskatoon bush	milk̲'oox̲s	salmonberry		
k̲'oox̲st	Douglas maple	sg̲ang̲apk̲'oyp	bunchberry plant	milts'ook'	chokecherry		
seek̲s	spruce	sg̲anhaxdakw	bow plant'	milkst	wild crabapple		
sginist	pine	sg̲anis	soapberry bush	'miyahl (E)	lowbush blueberry		
simgan	red cedar	sg̲ank̲ala'ast	rose bush	'miyehl (W)	lowbush blueberry		
wihl	yellow cedar	sg̲anleek̲	dogbane plant	naasik'	raspberry		
		sg̲anmilkst	crabapple tree	nisk̲'o'o	thimbleberry		
		sg̲ananaw	pincherry tree	is	soapberry		
		sg̲ananax̲	hawthorne bush	dilawsa	gooseberry		
		sg̲antsak' (W)	hazel bush	g̲ale'e/k̲'ale'e	rose hips		
		sg̲antsiks	Indian hellebore plant	gam	saskatoon		
		sg̲antsidipxst	highbush cranberry	g̲adimis	black huckleberry (black fruit)		
		hlisg̲ant'imi'yt (?)	wintergreens etc.	simmaa'y	black huckleberry general and golden brown fruited form		
		sg̲anloots'	red elderberry	ts'idipx̲s	highbush cranberry		
				sbikst	highbush cranberry		
				k̲'ots (?)	Solomon's seal		
				t'ipyeest (?)	lavaberries'		
				t'imi'yt (?)	kinnikinnik		
				loots' (?)			

TABLE 5-2

'LIFE FORM' AFFILIATIONS OF GITKSAN GENERICS

'flowers'		'grass'		'fungus'		other		moss	
majagalee	'wildflower'	habasxw	'hay' or grass	gayda ts'uuts	fungus	gesgan	'tree hair'	umhixum miinhl gan	'moss under trees'
lhlee'em ts'ak	'bleedng nose	habasxum t'ax		'maskwa luuluk' (E)	*Lycoperdon* spp	gwilahl ganaa'w	'frog blanket'	umhixw	moss
				mihixwhl	'birch fungus'	ligimixhl gan	'tree fur'	umhixum 'yiip	'moss on soil'
				diuxw	'birch fungus'				

TABLE 5-3
PLANTS IDENTIFIED AS 'FLOWERS' BY HARLAN SMITH'S CONSULTANTS IN 1925-26

Latin Name	Smith's orthography	Gitksan term
Mentha arvensis	mezerulē	**majag̲alee**
Heuchera glabra	skan mezerulē	**sg̲an majag̲alee**
Parnassia palustris var. *montanensis*	skan mizerlay	**sg̲an majag̲alee**
Corydalis aurea	megerle	**majag̲alee**
Clematis columbiana	mezerulē	**majag̲alee**

TABLE 5-4
PLANTS OF UNKNOWN AFFILIATION

Gitksan name	English meaning	probably **sg̱an**	ambiguous or other
g̱ahldaats	yellow pond lily		✓
gasx̱	riceroot lily	✓	
haast	fireweed	✓	
ha'mooḵ	cow parsnip	✓	
haglmgasxw	peavine		✓
hooblxs 'wilgat	Queen's cup		✓
lsxum sgan'lsxw (E)/	'smelly plant' valerian, mint?	✓	
lsxum sḵ'ooks (W)	'smelly plant' valerian, mint?	✓	
ḵ'awts	'wild carrots' and carrots	✓	
wa'umst	devil's club	✓	
x̱sneenauntwxt	yarrow and everlasting		✓
x̱hlaahl	red osier	✓	
hlsg̱ahldaatsxw	water arum, calla lily		✓

TABLE 5-5
POSTULATED INTERMEDIATE GROUPINGS

'ferns'	
damtx (E)/**demtx** (W)	inedible fernroot
ax̱	edible fern root
hap'iba'a	bracken

'clubmosses'	
belena 'watex̱ (E)/**belena 'wetex̱** (W)	various *Lycopodium* spp
x̱aadax̱	unknown

'horsetails'	
hismaawintxw	various *Equisetum* spp
maawin	*Equisetum hiemale* and *pratense*

'conifers or evergreens'	
amgiikw	hemlock
hoo'oxs	'balsam', subalpine fir
seeḵs	spruce
sgannax̱noḵ or **lax̱sa lax̱noḵ**	common and rocky mountain juniper
sginist	lodgepole pine
simg̱an or **amhat'a'l**	western red cedar
wihl	yellow cedar
xhlee'e	amabilis fir

'alders'	
giist	'mountain alder'
amluux	alder

'willows'	
x̱hlaahl	'red willow'
'waasan and **am'waasan**	willow
? **giist**	'grey willow', *Alnus incana*

'kinnikinnik and relatives'	
sg̱ant'imi'yt	kinnikinnik; and low bush cranberry?
hisg̱ant'imi'yt	prince's pine, false box, ?wintergreens

"bear's berries" maa'ya smex	
maa'ytwhl smex	*Aralia nudicaulis*
maa'ya smex	*Clintonia uniflora, Streptopus roseus, Smilacina stellata* and *?trifoliata*
xsduu'lixs	*Actaea rubra* , *Streptopus amplexifolius* , and *Disporum hookeri*
hissg̱anḵ'ots	*Smilacina stellata* and *?trifoliata*

lichens	
geeg̱an	'tree hair'
ligimthl g̱an	'tree fur'
gwilaih g̱anaa'w	'frog blankets'

TABLE 5-6
COORDINATE NAMES

Gitksan term	English meaning	Scientific Names	Coordinate taxa Gitksan name	English Name	Scientific Name
hisgant'iml'yt	wintergreens and false box	*Pyrola*, *Orthilia and Chimaphila* spp.; *Pachystima myrsinites*	**t'iml'yt**	kinnikinnik	*Arctostaphylos uva-ursi*
hisgahidaatsxw	wild calla or water arum	*Calla palustris*	**gahidaats**	yellow pond lily	*Nuphar polysepalum*
hisha'mookxwit	Northern rein orchid	*Platanthera hyperborea*	**ha'mook**	cow parsnip	*Heracleum lanatum*
hismaawintxw	horsetails and scouring rushes	*Equisetum arvense, E. variegatum, E. hyemale, and E. sylvaticum*	**maawin**	meadow horsetail and common scouring rush	*Equisetum pratense* and *E. hiemale*
hisgamaawin	northern scouring rush and common horsetail	*Equisetum variegatum* and *E. arvense*	**maawin**	common scouring rush, meadow horsetail	*Equisetum hiemale* and *E. pratense*
his'waasantxwit	unknown	unknown	**'waasan**	willow	*Salix* spp.
hisgank'ots	small Solomon's seal plant	*Smilacina trifoliata* [1]	**k'ots**	false Solomon's Seal	*Smilacina racemosa*
from Smith (1926):					
hisleekxwit	sweet cicely and goats beard	*Osmorrhiza* sp. and [probably] *Aruncus sylvester*	**leek**	spreading dogbane	*Apocynum androsimaefolium*
hisk'aawtsit	heal all	*Prunella vulgaris*	**k'aawts**	lupine	*Lupinus arcticus*
hisgant'iml'yt	false box	*Pachystima myrsinites*	**t'iml'yt**	kinnikinnik	*Arctostaphylos uva-ursi*
hisnisko'otxwit	white geranium	*Geranium richardsonii*	**nisko'o**	thimbleberry	*Rubus parviflorus*
hishaawakxwit	yellow mountain avens	*Dryas drummondii*	**haawak**	birch	*Betula papyrifera*
hishaastxwit	agrimony	*Agrimonia gyrosepala*	**haast**	fireweed	*Epilobium angustifolium*
hishabaaxwit	harebell	*Campanula rotundifolia*	**habaaxw**	grass or hay	Gramineae, Cyperaceae etc.
hishinakxwit	one-flowered rein orchid	*Habenaria obtusata*	**hinak**	skunk cabbage	*Lysichiton americanum*
hisgank'ots	star flowered solomon's seal	*Smilacina stellata*	**k'ots**	false Solomon's seal	*Smilacina racemosa*
hismaawintxw	"branched horsetail rush"	*Equisetum arvense* ?	**maawin**	"horsetail rush"	*Equisetum hyemale (?)*
hisganihoot	hardhack, spirea	*Spirea douglasii* var *menziesii*	**?**	unknown	

[1] This identification was made from a photograph in Plants of Northern British Columbia by Art Mathews and appears in Mathews n.d.

TABLE 5-7
UNNAMED PLANTS

English name	Scientific Name	Consultant
alpine willow	*Salix arcticus ssp. crassujulis*	OR
rattlesnake plantain	*Goodyera oblongifolia*	OR, DG
northern bedstraw	*Galium boreale*	OR
sweet cicely	*Osmorhiza* sp.	OR, DG
heartleaved twayblade	*Listera cordata*	OR
river beauty	*Epilobium latifolium*	OR
wild mint[1]	*Mentha arvensis*	OR, DG?, PM
alpine clubmoss	*Lycopodium* cf. *sitchense*	DG
fir clubmoss[2]	*Huperzia selago*	DG
one-sided wintergreen	*Orthilia secunda*	DG
green wintergreen	*Pyrola chlorantha*	OR
Prince's pine[3]	*Chimaphila umbellata*	OR
oak fern	*Gymnocarpium dryopteris*	OR

1 DG's first reaction was to begin talking about **lsxumsgan'lsxw**, 'smelly plant? *Valeriana sitchensis.* He seemed confused when I said the specimen was mint.
2 fir clubmoss was lumped with moss by OR, and likened to **xaadax**
by DG who did not give it a name
3 This was called **hlssgant'lml'yt** by DG

TABLE 5-8
PLANTS SAID TO HAVE NO NAME BY HARLAN SMITH'S CONSULTANTS, 1925-1926

English name	Latin Name
northern bedstraw	*Galium boreale*
twinflower	*Linnea borealis*
aster	*Aster junceus* Ait.•
daisy fleabane	*Erigeron philadelphicus*
goldenrod	*Solidago danacensis* var. *subserrata*
arnica	*Arnica cordifolia*
ragwort	*Senecio cymbalarioides*
ragwort	*Senecio Balsamitae* Muhl.•
rosy pussy toes	*Antennaria rosea*
wooly thistle	*Cirsium(Carduus) undulatum* (Nutt.) Spreng•
hawksbeard	*Crepis elegans*
yellow rattle	*Rhinanthus crista-galli*
penstemon, turtlehead	*Nothochelone nemorosa*
blue-eyed mary	*Collinsia parviflora*
blue-bells	*Mertensia paniculata*
gilia	*Gilia liniaris*
gilia	*Gilia gracilis*
showy Jacob's ladder	*Polemonium pulcherrimum*
buckbean, bogbean	*Menyanthes trifoliata*
pacific starflower	*Trientalis arctica* •
Indian Pipe	*Monotropa uniflora*
pink wintergreen	*Pyrola asarifolia*
Prince's pine	*Chimaphila umbellata*
silverweed	*Potentilla viridescens* Rydb. •
saxifrage	*Saxifraga tricuspidata* (probably *S. bronchialis*)
grass-of-parnassus	*Parnassia fimbriata*
marsh grass-of-parnassus	*Parnassia palustris*
ball mustard	*Neslia paniculata* (L.) Desv.•
draba	*Draba lutea* Gilib.•
rock cress	*Arabis hirsuta* (L.) Scopt.•
wormseed mustard	*Erysimum cheiranthoides* L. •
creeping buttercup	*Ranunculus repens* L.
violet	*Viola canadensis*
violet	*Viola adunca*
northern geranium	*Geranium erianthum*
alpine milk vetch	*Astragalus alpinus*
field crazy weed	*Oxytropis monticola* •
birdfoot clover	*Hosackia denticulata* •

Species marked with • may be obsolete or misapplied scientific names

TABLE 5-9
PLANT ORGANS OR 'PARTONS'

Gitksan term	English meaning
gan	wood
gult	dry conifer needles
hlagant	stem
lax̱s	conifer bough or needles
maas	bark
maa'y	berry or fruit
majagalee	flower
meeḵ	cone
sgan	pitch
wils	root
'yens W/'yans E	leaf
hla'ushl 'waasen	willow catkin
binaaḵt	thorns
silswg̱it	thorns

Notes

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[1] Modern classification schemata often include five Kingdoms, Plantae, Animalia, Fungi, Protista (unicellular eucaryotic organisms) and Monera (procaryotic organisms including blue green algae and various groups of bacteria) (cf. Curtis 1983:385; Barrett et al 1986 :1069-1074.)

[2] "Berry" is used here in the popular sense of small fruits. Morphologically, the fruits utilized by the Gitksan include drupes, pomes, berries, and aggregate fruit, as well as one aberrant example of a spheroidal coloured fleshy leaf.

[3] Interestingly, the type pointed out to me by this name, *Lycoperdon* sp., bears a Latin name which also alludes to an uncanny character and metaphoric farting; the generic name translates as 'wolf fart'. The smokelike puff of spores out of a pore in the top of a ripe fruiting body when squeezed or stepped on is the 'fart' described in the names.

[4] In 1996, Art Mathews indicated that dandelion was called **bax̲bok̲'** in the Eastern dialect area, although the Western dialect apparently lacks a name for it. Smith's consultant was from Gitwingax̲ in the Western dialect area.

[5] The plants I specifically asked about were yellow pond lily, riceroot lily, cow parsnip, Queen's cup, devil's club, yarrow/everlasting, red osier dogwood, water arum, Sitka valerian, moss, grass/hay, and stonecrop. Art Mathews Jr. added fireweed to the list, and suggested one only says **sgan haast** when it is necessary to clarify that one is referring to a plant [floral form] rather than a dog [animal] when speaking to Coast Tsimshian people. Dog **aas**, is similar to fireweed **haast** in Coast Tsimshian, where they are unambiguous in Gitksen.

[6] This similarity is also recognized in England, where 'osier' means willow; both shoots of true willow and the red osier are used for willow basketry (wickerwork).

[7] Several other lichen names given in Art Mathews n.d. probably belong in this intermediate. I have not included these groups in the present paper because the extension and identity of their referents have not been checked, nor have field specimens been obtained for technical determination.

Mathews lists **ges 'wiiget** as *Bryoria lanestris*, **hla'yimk̲hl gan** as *Alectoria sarmentosa* and **hla'anisihl sginist** as *Usnea lapponica*.

[8] The term **gadimis** is a possible exception; it is a term denoting a less preferred form of the black huckleberry, *Vaccinium membranaceum*. The name is not related linguistically to **simmaa'y**, 'real berry', which applies to the species in general, and to the preferred large, golden-brown fruited form. The difficulty is deciding if the term is best considered a second generic, or whether it is a specific or some other type of subdivision [see discussion of growth phases and sex phases of animals in Clément 1995]. An exception which overgeneralizes is the typical inclusion of both *Picea* x *lutzii* and *Picea mariana* in **seek̲s**, though recognition of different species of spruce in the Skeena Valley, where at least *Picea sitchensis, P. engelmannii* and *P. glauca* hybridize and intergrade, is arbitrary at best.

[9] "As there are two plants called by this name, this one [*Castilleja miniata*] is called short, the other ...[*Aquilegia formosa*] tall." (Smith n.d.:181) Smith reports two medicinal uses: a decoction of the whole plant for "nose bleed, bleeding, stiff lungs, bad eyes, and lame back, possibly caused by kidney trouble", and a decoction of the seeds for cough.

[10] The name means 'covers to the hips/groin' and presumably indicates the general stature of the plant.

[11] The smaller species *S. stellata* was named in coordination to *S. racemosa* by Smith's informant in 1926 (see Table 6) and was called **hissgank̲'ots**.

[12] However, **amk̲'oox̲st** means "aspen" while **k̲'oox̲st** means "maple". Another exception is **am'mel**, which means "cottonwood", but **'mel** means 'canoe'.

[13] **'Waasen/'waasan** apparently does not apply to the perennial montane prostrate willows, also botanically placed in the genus *Salix*. (Olive Ryan interview transcript 7/25/95). Olive Ryan did not apply any name to a specimen of the prostrate alpine willow *Salix arctica* ssp. *crassujulis*, although she readily named a leafy sprig of *Salix scouleriana*, the common tree sized willow of upland sites in that area.

[14] The elders were David Green, Olive Ryan, Pete Muldoe, Jeff Harris Sr., and a somewhat younger but very knowledgeable man, Art Mathews Jr. (Dinim Get), whose recently deceased father knew a great deal and also

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contributed to this project. The terms are **gaanaxws**, **gadimis**, **gesgan**, **hisgahldaatsxw**, **hlit'**, **isxum sgan'isxw**, **ligimtxgan**, **maa'yhl litsxw**, **maa'yim hagwilhuxw**, **maa'y welgan**, **sgantya'ytxw**, **maa'ya luulak'**, and the descriptive phrases **umhlxum yip** and **umhlxum miinhl gan**.

[15] This name was also given by Pete Muldoe to the short tree sized juniper *Juniperus scopulorum*; he said that slender young trees were used for bow construction. Olive Ryan in 1996 also provided this name for a photograph of a tree sized Rocky Mountain Juniper.

[16] Gottesfeld (1993) and Johnson-Gottesfeld and Hargus (in press) discuss this phenomenon for the Wet'suwet'en and other northwest Coast groups. Compton 1993 also mentions this phenomenon.

[17] See Plants in Traditional Narrative, Chapter 4.

[18] For example, Olive Ryan described false box (*Pachystima myrsinites*) as "waxberry", **t'imi'yt**, but mentioned that the real kind has berries. Other consultants have called it **hissgant'imi'yt**.

[19] An interesting case is presented by *Arnica cordifolia*, heart-leaved Arnica, which is an indigenous plant which has a medicinal use, but which was simply called, in English "sunflower" and no Gitksan name was offered.

[20] These forms were provided by Art Mathews Jr., though my orthography is slightly different.

[21] Possibly Gitksan people are comfortable with multiple names of different formality applying to plants, because people too have various names, depending on context and circumstances. Now, of course, people have legal English names which are registered with the government. Traditional Gitksan names include a series of names of different status and rank which a person may hold in the course of his or her lifetime. An adult of high status may hold more than one chiefly name and one or more **naxnok** names at the same time. These names are passed on separately in the lineage group. In addition, many people have nicknames by which they may be called for most of their lives; I believe this practice antedates the introduction of European Christian names and surnames, and may have lent some consistency of reference to individual people as they assumed a series of different names throughout their lives.

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[22] The fruits of all local species of angiosperms are relatively small and berry-like, although botanically they include a diversity of fruit types. In addition there are, of course, various dry capsules and legumes, which do not seem to be named in Sim'algax̱ .

[23] This similarity is reflected in the popular naturalist's term in English "ferns and fern allies", although the groups so included are diverse groups of very distant relationship and distinct morphology which are distinguishable in the Carboniferous Period of the Paleozoic and have been distinct for more than 300 million years.

[24] When asked directly if one could call the rhizome of yellow pondlily, or Indian hellebore **wis**, several consultants replied that they could not, and one suggested that one could use the term for these rhizomes (interview notes 1996.)

[25] I am uncertain if named flowers of some utility, such as the peavines, **hagimgasx**, 'wiping plant,' belong in this group. The use of **'yens** to designate lettuce might also be mentioned here.

[26] **Habasxw** is an antipassive nominalisation (a noun) of the verbal root /hap-/
"to cover"; "covering (n.), what covers." (Rigsby, personal communication 1996-1997).

[27] Their marine environment is reflected in recognition of a group of articulated coralline algae, and the presence of an intermediate of seven genera of (non-coralline) marine algae.

[28] The terms sχán,śχan ṁaʔı, mıdze ɢalɛ and łiksẏɛns are cognates of the Gitksan **sgan, maa'y, majagalee**, and **'yens**, though the Southern Tsimshian term sχán apparently includes all trees and shrubs, both the Gitksan **gan** and part of Gitksan **sgan**, and the berry group is labelled sχan ṁaʔı. The other terms collected by Compton (1993:455) ɢǽ́·xs (berry bushes/plants and bushes lacking edible fruits), ɢałdm ts'ubǽt (mushrooms), ænǽıń·nq (shelf fungi), and biłáx or biłǽx (moss) are not the same as the Gitksan terms.

Chapter Six

Gitksan Concepts of Health and the Nature of Illness

The Gitksan world view is fundamentally holistic. The social realm, that of social interaction and reciprocal obligation (see Chapters 2 and 3) extends to the plants and animals, and to the land itself.[1] All things are pervaded with spirit and with power, which can harm or help humans, depending, among other things, on the behaviour of the humans. Spirits of various kinds also exist. These include ***nax̲nok̲***, ghosts, and ancestral spirits, as well as the spirits of plants and animals (including fish and birds.) Health is an aspect of this holistic system, and is maintained in relationship with other social beings, including spirits of other species residing on the land and in the waters, ***nax̲nok̲***, and humans.

Modern Gitksan often speak of things as "supernatural" to indicate their more than ordinary power, though in Gitksan, spiritual power and ordinary material properties are both inherent in the world and thus "natural" (cf. Guédon 1984b). The land itself is imbued with power because of the relationship between people and the spirit powers residing on the land. The territorial relationship encompasses this spiritual aspect of power, which manifests itself in the Chief who holds title to the territory. The relationship between the power of a social group and the power of its territory is reciprocal and interactive; people lose power when their land is violated, and the land is weakened when the people become weak.

Gitksan concepts of health involve wholeness, cleanliness, balance, and control. Health is viewed as holistic, involving spirit, mind and body, as well as relations with other people and with the land itself. Good health and abundance stem from "living right", and being in balance. Excess invites retribution (Gottesfeld and Anderson 1988, Harris 1974, Jenness 1934). A balanced life includes respect for the land and for the animals and plants provided by the land for sustenance. Cleanliness is also seen as central to health and to spiritual power. Lack of cleanliness is a failing and predisposes one to disease. A "whole man" or "real man" (***Sim'oogit***, a chief) is a person with discipline and control, and chiefs are especially expected to practice control.

Accidents or illness are not random events, but occur if one is unlucky. "Luck", for the Gitksan, is not a matter of chance, but a consequence of right living and ritual preparation.[2] Failure to exercise self restraint and follow prescribed rituals or to respect plants, animals, oneself or other people have negative consequences in terms of predisposing one to bad fortune. Lack of luck can lead to a number of negative consequences, including health consequences such as injuries from accidents, illness, or other difficulties such as low status, poverty, poor hunting and trapping luck, and family disharmony. There is the concept, particularly among high status or chiefly families, that accidents or other evidence of misfortune bring shame. This is because of the cultural belief that proper behaviour and observance of particular rituals bring good "luck"; therefore, the individual who suffers bad "luck" must have shown poor self control or otherwise have lacked the discipline necessary to ensure "luck". Thus, a chief who has an experience such as falling overboard and nearly drowning has to give a feast to "wipe off the shame"[3] .

Health and power (*daxgyet*)[4] both involve "luck" and cleanliness, which are intimately interrelated. Exercise of control is also central. Control is demonstrated in fasting and sexual abstinence, which enables one to receive power. Learning self control was a prominent feature of traditional child rearing, particularly in high status families (cf. Harris 1989, 1994). Many of the rigours of training of young men and women, obligations of adult men and women, and practices before activities such as hunting or trapping are explained in terms of their beneficial effects on the person and their health benefits. Elderly women who experienced the relatively rigorous puberty seclusion which was traditionally practiced by the Gitksan attribute their relative health and advanced age to having observed the proper behaviours during their pubertal year. From the societal perspective, these practices also ensured a continued relationship with the land and with resource species. Indeed, the consequence to society of a girl failing to avert her eyes from a mountain[5] was that the mountain would become barren and "dry up" and both berries and game would fail. The consequence to the girl was that her eyesight would fail or she might become blind. Violation of taboos, that is, improper, disrespectful behaviour which shows poor self-control, is expected to have serious consequences: illness and other forms of bad "luck", including consequences to larger groups of relatives, such as failure of food supplies or other natural disasters.

Gitksan views of causation of illness and accident derive largely from the concepts outlined above. That is, whatever the proximate cause of illness or injury, the ultimate cause is lack of balance, cleanliness and control. The proximate causes of illness are often understood in ways quite similar to the understandings of biomedicine, and in these cases the rationale and means of treatment are readily comprehensible by Eurocanadians. There is a class of important illnesses, however, which are partial exceptions to this generalization: those which derive from the actions of malevolent spirits, or from the contamination or intrusion of evil due to the actions of practitioners of evil magic, called *haldawgit*[6] by the Gitksan. In a sense, contamination or lack of power are still the ultimate cause of illness; it may be that the victim him or herself is blameless, but has succumbed to the nefarious actions of others, or perhaps fate. Treating these types of illness differs from dealing with other types of illness, and will be discussed in a subsequent sections of this chapter (see witchcraft and traditional shamanism).

Gitksan approaches to health maintenance and to healing follow from the conceptual framework I have just outlined. Modern Gitksan combine a variety of strategies, including Western allopathic medicine, use of chiropractors or herbalists, Christian faith healing and other forms of alternative medicine, with more traditional practices. Traditional approaches involved health maintenance through ritual practice and self discipline, appropriate living, and use of tonics and cleansing medications. In case of illness or accident, herbal and sometimes animal medications were used along with necessary physical manipulations such as bonesetting or massage, and various spiritually efficacious treatments might be employed. If these were ineffective, specialist healers, *halayt* or *halaydim swanasxw*[7] (usually called shamans or Medicine Men in the literature) were called.

In Gitksan traditional medicine, there were several levels of treatment of illness or injury. These included first, family treatment by non-specialists who were recognized as having a certain amount of knowledge. This would include close relatives of the patient such as parents or aunts and uncles, as well as grandparents. Then there were people with specialized knowledge, such as herbalists or bonesetters. There were also specialists to assist in childbirth. The highest status healing practitioner was the ***halayt*** or ***halaydim swanasxw***. Mary Johnson has said that a Medicine Man [***halayt***] name was equivalent [in status] to the name of a chief (transcript 8/2/95 interview). As will be discussed below, shamanic specialists experienced spiritual contact and significant illness, followed by a period of seclusion and healing, along with training, by other shamans. These practitioners specialized in divination and cure by spiritual manipulation of causes of illness. They are often called Indian Doctors, or Medicine Men in English by modern Gitksan. They are sharply distinguished from the practitioners of harmful magic, ***haldawgit***, called in English variously "witchdoctors", or "witchcraft",[8] although a ***halayt*** as a powerful being does have the power to harm as well as heal. Ultimately his source of power is different, deriving from spiritual potency, rather than formulaic employment of magical rituals involving highly polluting substances, the method used by the ***haldawgit*** (cf Guédon 1984a).

Cleanliness and Contamination

Gitksan people continue to conceptualize illness as a kind of contamination or "dirt" which should be cleaned on a physical or spiritual level, or both. Modern Gitksan people often refer to disease causing entities as "germs", but use this word in a folk sense as meaning invisible disease causing entities, and continue to employ treatments such as bathing with or burning powdered Indian hellebore root, or burning a smudge of devil's club peelings, to drive off or eliminate them, as well as using traditional cleansing treatments. Elders suggest that the use of herbs which promote sweating, a physiological form of cleansing like purging, along with the use of the "sweat hut", will have the action of driving out the disease:

> It is good they want to use a sweathouse. They will use it and drink (***ha'ums***) devil's club, so that their sickness can be pushed out. You see how people sweat when they use a sweathouse. That is why they use it (Kispiox Elders Meeting transcript 2/15/88).

Use of a powerful emetic preparation made from red elderberry root to treat influenza and inability to eat illustrates the concept that cleaning "all that stuff out of there" is necessary for the body to return to normal function. Balsam pitch (when swallowed) is described as a powerful cleansing medicine (e.g. purgative); it is usually taken with some type of grease. Mary Johnson tells a humorous tale of a man who experienced a dramatic cleansing by taking oolachan grease and balsam pitch in the spring time; he suffered at the time, but his condition, described by Mary as "paralysed arthritis" improved, and he regained proper use of his legs (transcript 8/2/95).

A narrative from the twenties reported by Barbeau (1973:75) also illustrates the concept that use of spiritually potent herbs along with substances which function as purgatives will be effective against serious illness. Here the context is a shamanic quest for insight into how to treat victims of the 1918 influenza epidemic, which caused substantial mortality in the Gitksan area as well as much of the rest of the world. In the story of "Medicine Woman of Sickness" told by Robert Wilson of Kispiox Village, the shaman obtains a song from the Medicine Woman of Sickness, and learns that the victims should be treated with the song in conjunction with burning Indian hellebore rootstock in the home, and taking oolachan grease and "devil's club juice".

Fasting, especially in context with mild purgatives and diuretic teas such as devil's club tea, is considered a very effective way to cleanse one's self; this allows power to enter in.[9] Shamans, for example, gained power by fasting, and could not practice if they had recently eaten (Mary Johnson, 7/17/95 and 8/2/95; Barbeau 1973).

Purification, Cleansing and *Sisatxw*

Preventative treatments to maintain luck and/or purification to restore luck involve use of plants such as devil's club in conjunction with fasting and sexual abstinence, and practices such as bathing in ice cold river water for prolonged periods. Devil's club decoctions are used both for external washing and taken internally as tea. Devil's club has diuretic properties, and in large or strong doses has purgative or emetic properties. This is consistent with the cultural aim of "cleansing", driving out impurities. Bathing with Indian hellebore infusions can also be employed for "luck"; as it is quite toxic, it is not taken internally.

The ritual practice of ***sisatxw*** increases "luck" and power; it was practiced for prolonged periods by men who were going trapping or who otherwise sought to increase their "luck" for warfare or gambling. ***Sisatxw*** has variations, but essentially involves sexual abstinence or control of sexuality, ingestion of devil's club inner bark pills, devil's club tea, and bathing in devil's club. These activities are carried out in prescribed patterns of days, frequently involving the sacred number four, which also is conceptually linked to corners of the house. A narrative by Mrs. Harriet Hudson (Cove and MacDonald 1987) describing the teaching of a type of the Four Corners ***sisatxw*** is included in the "plants in traditional narrative" section of Chapter 4. A very similar type of Four Corners ritual was described by Jeff Harris Sr., Luus (Kispiox Elders' Meeting 2/15/88). Another elder and trapper, Ernest Hyzims (notes 11/25/87), employs a Fall ritual which alternates four days of chewing devil's club in the morning on an empty stomach with four days of bathing in ice water up to the neck in a creek. The devil's club and bathing are then repeated, giving four fours in all.

Sisatxw is considered a very powerful ritual; Jeff Harris Sr. (Luus) told a story about his step-father: after finishing his ***sisatxw*** he killed an eagle that was flying low over his canoe by simply pointing at it; he never fired a gun (Elders Meeting transcript, 2/15/88). It is also emphasized that one must carefully control one's anger after completing ***sisatxw*** lest one cause harm to people inadvertently. The longer one carries on ***sisatxw***, the more powerful one becomes.

> When you go through ***sisatxw*** you have to think about ***sisatxw***. You have to think only about this and not do other things. After you are finished after one month you can go out after your goal. Go through with what you start and fulfil it. Whatever it may be and then you will achieve it (Jeff Harris Sr., Luus, Kispiox Elders Meeting 2/15/88).

In the Gitksan Legend of Hawow, an ***adaawak*** of the House of Hawow in Kispiox, the unlucky man is taught about cleansing and the use of devil's club to restore his luck after losing all of his property, and even his wife, gambling. After faithfully following the instructions of the spirit being he met with, he is able to return to the village and regain all he lost. In addition, he acquired supernatural powers.

The following excerpt was told by Mary Johnson, Antk'ulilbixsxw, with permission from the current Hawaw, her sister-in-law Alice Wilson:

> Like Stanley [Wilson, her brother] said, in the olden days, people are gambling, what we call [***lahaal***]. [***Hawaw***] loose out, [they] kept all his merchandise they said, so he's got nothing. So he left his family and go out in the bush and he just walk,

> didn't know where to go and then he - when he get to a little hut where a lady lived, she was lullabying her baby and without, she didn't see him coming, - approach the little hut, but he, she spoke up, "Come in if you are the one that's wandering around." She knows. She's supernatural lady and he did come in the h[ut], she gave him something to eat and after she pour water in where they took a bath and she bath this man. She took some chips of wood. You know how sharp those chips are - .... That's what she use to scrape the man's skin off and all the dirt come off and pieces of what they use in the olden days is moss for diapers, baby's diapers and the lady says after your wife tend to the baby she didn't wash and fix something for you to eat and then she changed the water again and put some more water and bathed him and scraped him again. Then there's some more dirt come off mixed with women's periods. And then the lady said, tell him again, after she tend to her periods she never wash her hands and fix you something to eat. That's why you are so unlucky. Unlucky is what we call [***lasatxw***]. And after he's well cleaned and he eats devil's club while he's in the woods. He chew some devil's club and they didn't say how long - but ... after he's really lucky... (Kispiox Elders Meeting transcript 2/15/88).

In the story of the Nax̱noḵ spirit called Waadimxhl, a lucky person who encounters her can learn about all of his unlucky practices and correct them to become lucky. One man was said to have seen her and her crying infant near Four Mile Canyon about ten years ago, but did not feel prepared to approach her. Another man, the late Robert Wilson who contributed the Medicine Woman Sickness narrative to Barbeau (1973:74-75) was reputed to have heard her and her infant in the woods some ways north of Kispiox Village a number of years earlier. Unlucky practices described included the following: "...you never wash yourself all the time. You eat hairs when you feed. Your babies are all dirty..." Jeff Harris Sr. interview notes 9/30/87). Again, the emphasis is on cleanliness to obtain luck.

Spiritual Contamination–"Witchcraft" or Sorcery as a Cause of Illness and Misfortune

The Gitksan have a well developed concept of ***x̱yibit***,[10] which they term "witchcraft" in English. Witchcraft refers to the malevolent actions of other people, performed in secret, to cause harm to a person by the use of evil sorcery. A practitioner of ***x̱yibit*** is referred to as a ***haldawgit***. The classic form of Gitksan "witchcraft" is the use of a witchcraft box to bring about the death of the victim slowly and at a distance. The witchcraft box (***galdim haldawgit***) is a wooden box about 25 by 50cm in size, crossed by strings. In order to bewitch a person, the sorcerer obtains a piece of that person's clothing or hair and ties it to one of the strings. Supposedly when the object representing the person being witched touches the bottom of the box, the person will die. There are stories of how shamans (***halayt*** or ***halaydim swanasxw***) retrieved witchcraft boxes after revelation of the location in dreams and saved victims (see section on shamanism).

The following narrative gives a sense of the currency of concern over "witchcraft" and the kind of dangers it represents:

> So, so the witchcraft, they just sneak around, even today.
>
> They even cause someone to commit suicide. Ah, I mean the witchcraft, not the Medicine Man. Long time ago, they were having in a–there was an old building down below, it's our church before this church is built. We were having service there just about seven, when somebody told us that a young guy shot himself at Glen Vowell. So, they took, well, they were having Church over there too. And the two Churches close down and they all went down there.
>
> And this was Saturday when someone from this Village went out to, to hunt for some moose, on the, they went to the road where the other side bridge is. Go way up. And it's too dusky. He think he just wounded a moose. So, it'll be dark soon, so he started home. And when he get–there's a great big hill, not far from the bridge. Go up there, then climb up the great big hill. And as he was walking down the road, some, someone cried out on top of the road. There were humans. They all cried out the same ti[me]—some were woman, some are men.
>
> On Saturday when this hunter heard all the cryin' across there, and on Sunday night at seven when the young man shot himself at Glen Vowell for over nothing (Mary Johnson, Antk'ulilbixsxw, transcript 8/2/95).

As there are currently no practicing shamans, those fearing witchcraft at the present time use amulets and smudges for protection and cleansing, and avoid close contact with, or excessive thought about, persons suspected of being ***haldawgit***. People also fear contact with unclean substances such as menstrual blood or corpses; bodies are closely watched during the period when they lie in state to make sure that no one with evil intentions "does anything" to the corpse, or puts any foreign object in the coffin. Some people avoid eating in public gatherings for fear of food contamination by someone wishing to harm them through witchcraft.

The most important herb for witchcraft protection is Indian hellebore root (***malgwasxw***), as discussed in Chapter 4. Many people carry a piece of this root on their person or in a purse as a protective device, or leave a piece in their place of work. One can also burn Indian hellebore root in the dwelling to cleanse it, or scrape the powder of a piece of dried root into laundry water to cleanse clothing which may have been contaminated by someone. Harlan Smith reported that evil witchdoctors [***haldawgit***] could not smoke the root of "skunk cabbage"(Smith refers here to Indian hellebore, *Veratrum viride*, not *Lysichiton americanum*). "It would kill them and destroy their magic" (Smith n.d.: 74). A story told to me by a modern Gitksan woman underlines this belief that Indian hellebore is avoided by "witches": at a funeral, a woman who was acting strangely was suspected of being a witch because she reacted with fear to the idea of burning ***malgwasxw*** (Indian hellebore root), even though it was actually a mosquito coil and someone told her the smell was ***malgwasxw*** for a joke.

Ghosts and Spirits as Sources of Illness or Risk

The Gitksan people believe in and fear ghosts. Modern Gitksan people report seeing ghosts of recently deceased people, and people may have portentous dreams in which dead relatives invite them to feast. If one partakes of food offered by the dead, death is likely to result. Burning a pieces of Indian hellebore root in the dwelling will repel the ghost. Carrying a piece of valerian root has similar protective properties to carrying Indian hellebore root in terms of repelling ghosts and witchcraft.

Medicine song sickness is a special type of illness related to spirit contact (Jenness 1943). In its fully developed form, it is apparently not currently experienced by Gitksan people. If a person encountered a spirit, he or she might be given a song which could give power to the possessor, and which might be part of the spiritual contact involved in becoming a shaman. Until one mastered the spirit, or managed to bring forth the song, the person displayed symptoms of illness, and could even die. When this was part of the initial acquisition of power of a future shaman, the condition required treatment and support by other ***halaydim swanasxw*** to release the song and help the neophyte acquire the power to control it. If the person was an established shaman, refusal to sing the spirit-given song when received could result in lingering illness or death. This became an issue during the period of intense Christianization and acculturation in the early years of this century, as described by Jenness for the Wet'suwet'en (1943). A brief description by elder Percy Sterritt of Kispiox Village of his grandmother's situation describes this type of illness:

> Like when she's in bed, this . . .she either hear this song or something. And the minute she hears it she go ahead and sings it, like the Indian songs and stuff like that. And that's why she wouldn't stay with us in Hazelton one time. We were living in Two Mile and I got her down, she was getting quite old. I want to look after her because they're the ones that raised me. She stayed with us for about four days and she's got to go home, she just want to go back home. I asked her why and she told me that likes to sing and she can't because the kids are all asleep. That's the only thing, that I knew that they can't. She said that if she doesn't do that, if she sing when it comes on to her, she gets sick, real sick (Percy Sterritt tape transcript 12/18/87).

Soul Capture as a Cause of Illness or Death

Like many peoples around the world, the Gitksan believe that the soul or spirit of a person can travel outside of the body, as in dreaming or during the divination practices of ***halaayt***.[11] It is also possible for the soul to become separated from the body and captured by another being, or imprisoned in a spiritually dangerous place, a ***sbinax̱noḵ*** . If this happens, the only recourse is shamanic healing.

Otter possession is the most frequently encountered belief in soul capture. Otters,[12] ***'watsx̱***, are seen as spiritually very powerful beings, who may assume the form of a human, particularly the form of a beautiful woman or man, or the spouse or lover of the victim. If the victim does not perceive the true nature of the visitor, the victim may have intercourse with the otter, believing it to be a human lover. The otter then gains power over the victim, who becomes mad and wanders off, incapable of speech or eating, until he or she dies. This risk is particularly associated with being alone out on the land remote from other people, and there is a ritual of saying ***Yukwhl ma 'watsx̱ lee*** ('Maybe an otter') when people approach in the "bush," to make sure they are really who they seem, and not otters. Otter possession is fatal if untreated. Jeff Harris Sr. attributed the disappearance and presumed death of a worker at the Sunnyside Cannery in Prince Rupert to an otter encounter in the late 1930's:

> There was a man in Sunnyside [Cannery in Port Edward] 30 or 40 years ago. He was Norman, the net boss. He got that way [bewitched by an otter]. They never found him. Bobby Stevens and [second name not recorded] walked up from MP cannery at Rupert [to Sunnyside]. They said at night this man was laying with the otter. They got off the road and threw stones at him. He threw stones back. He thought he was with a woman (Fieldtrip Notes, October 22, 1987).

A powerful shaman might be able to treat otter possession if the victim and the offending otter could be found soon enough.

> And the otter took this guy, the Chief, one of the Chief in the village. The Chief came from Mouse House, the Frog Tribe. ...And – the Chief's wife came down here to plant some potatoes. So that's why I believe it's after the white people came that it happened. And after she finished planting she went back somewhere at First Cabin [a location along the Telegraph Trail north of Kispiox Village], they said, and the husband is not in the camp. So he forget how many days she's wondering around through the creek. Hollering, and hollering out his name. Finally he find her, him, and he's out of his mind. And his wife sees the otter jumping up and down in the creek. So that's all he sees, and come back and tell the news. That's when they call the highest Chief at Stikine to help him. And the highest chief came, and he ask where, where he is, and they took him up there. And he gave an advice that they they should kill the otter and, and cut out his u–, the otter's urine,[13] and make the man swallow it.
>
> ... "Here, drink this! Drink this!" And he– they made him swallow it. And he gather some branches, of, of, of, trees, like the balsam branches, and, and jackpine and, and– what they call? seeḵs [spruce] ...
>
> And he make them build a fire. The medicine man build a small fire, and let the branches just, just, smoke, not really burn. And he tied the foot, both feet of the patient, and hung him upside down. And let they build a smoke underneath him. They didn't say how long they did that. So that cures him. Besides he practice on him (Mary Johnson, Antk'ulilbixsxw, 7/17/95 transcript).

Treatment of Spiritual Ailments

Treatment of spiritual ailments can also take place through a ritual spiritual cleansing. This can involve a series of movements to manipulate and cleanse the "aura" of the person, gathering the contamination together and disposing of it. I was told by one woman that it is very important to direct the cleansing away from the heart, "... which is the most important, the centre." (GWES workshop notes 3/14/91). Cleansing can also be done by washing the person in an infusion of Indian Hellebore, or smudging with Indian hellebore, juniper boughs, devil's club, sage, or a combination of several of these herbs. This approach to treatment is also advocated for substance abusers and alcoholics.

Coma, stroke-like symptoms (***godalol'x***) or "mental disturbances" are seen as due to evil spirits or curses by evil sorcerers. Gitksan elders advocate a smudge treatment with spiritually powerful plants as a cure or antidote for such conditions. The patient is seated, covered in a blanket, with the smudge smouldering beneath. See Chapter 4 for details of herbs used for this type of treatment. If smudging was ineffective, then a group of 6 to 10 ***haalayt*** (shamans) would be called together to work on the patient. By pooling their power they might be effective where the medication was insufficient.

Sweat Bath

For the Gitksan, the sweat bath or ***anguxw'uutx*** has two functions. The first is as part of ***sisatxw***, to cleanse and increase "luck", especially for hunters and trappers. It was employed in a different and therapeutic manner for treatment of arthritis or rheumatism, and for fever or illness (Smith n.d., Pete Muldoe Interview notes 11/23/87, Solomon Marsden Gitwingax̱ Elders Meeting Notes 2/17/88). It is also described as a preventative for illness. Various herbs may be used in conjunction with the sweat house, both as teas drunk before or during the sweat, and as smudges by being burned on the hot rocks.[14] These can either be of a therapeutic or cleansing nature; indeed, cleansing herbs are considered central to therapy in many instances, by "pushing out" the illness. Some elders have also advocated use of the sweat house for treatment of alcoholism in recent times.

Cree or Lakota style sweats may be used in conjunction with group therapy and traditional cultural and spiritual activities in camps for troubled youth or alcohol and drug abuse treatment centres. Sweats are a regular part of the treatment program of the Wilp Si Satxw, a drug and alcohol treatment centre at Gitwingax̱. The youth camp at Wilp Si Satxw and the health workers in Hazelton also held Plains style sweats during the past two summers. These differ from traditional Gitksan sweats, but have resonances with local tradition, and make sense to some local people as a health promotion approach. Other people have reservations about the safety of Cree sweats (David Young, personal communication 1997).

Traditional Shamanic Healing

The most specialized type of traditional Gitksan healing was the treatment of serious or prolonged illness by shamans, or ***haalayt***. The rationale of shamanic healing and the holistic nature of Gitksan conceptions of healing are both illustrated by the words of Solomon Marsden, Chief Xamlaxyeltxw of Git-anyaaw:

> When one is ill for no apparent reason a ***halayt*** is called to ***swanasxw*** ["breathe" or blow]. Say it's the work of bad spirits. There are no ***halayts*** today to do the ***swanasxw***. Therefore ***malgwasxw*** is used. It pushes out the bad spirits from that sick one. Also devil's club. It is correct what Gideon said [another chief and elder present at the meeting]. One who is very ill was given fish broth, grouse broth. This broth was able to start the blood of the sick one flowing (Solomon Marsden, Gitwingax̲ elders Meeting 2/17/88, Beverley Anderson translator).

Two brief accounts from modern elders of the same shamanic healing in the ?early 1920's in Kispiox village follow. The shamanic performances of Gitksan ***halaydim swanasxw*** emphasize dramatic firewalking, followed by touching the ailing patient. Urine, referred to in the account by Stanley Williams, gave power over ghosts and spirits, who were repelled by it.

> I saw Mihlax̲s [the name of a man, a Wolf from Kispiox] using ***swanasxw*** in Kispiox. I went there with my father to the house where they practice ***swanasxw*** (***Wilpswanasxw***) near Kispiox. One person spread the fire out and Mihlax̲s walked through it. There were ashes coming out from between his toes. He'd go through and then work on the sick, after which he left. Another one came forward, took his clothes and used a cloak. The other ***halayt*** ran forward and was pulling him around. That cloak was stuck to his back. I guess it eventually fell off. They were strong spiritually. Boots [Arthur Johnson] was the one, that one, he drank from a piss pot (Stanley Williams, Chief Gwis Gyen, Elders Meeting 2/17/88, Norman Moore translator).

> Arthur "Boots" was a ***halayt*** from Kispiox. He walked through the fire. They build a special place to perform. It is called ***wilpswanasxw***. It was about 30 feet by 30 feet. There was a big space [in the middle?]. Walk through the fire. There was a special place you had to sit down while they were working. You couldn't make any noise.
>
> Arthur walked through the fire and lay down [in the fire]. He got up and put his hands on the person [who was being healed]. He felt the person all over [Peter gestured quick patting movements with both hands at the same time as if feeling opposite sides of the person in unison]. [He] chase off the evil spirit (Peter Martin, 1/19/88).

The ***halayt*** wore a special regalia, the ***gwishalayt***, when healing. This included a grizzly claw crown and an apron with deer hoof or other tinklers, the ***ambilan*** . Round, not raven-shaped, rattles and a fisher skin also figured in the healing. The ***halayt*** or assistants drummed on a hand drum or beat sticks rhythmically. Photographs of the regalia during a simulated cure on the Nass River, and of shamans in their regalia from the Skeena River in the 1920's were made by Marius Barbeau (1958 : 43 and :39-40).

A person becomes a ***halayt*** by encounter with spirits. Usually, this required solitude in the woods, and fasting to gain the necessary power to master spirits.

> They have to spend a lot of solitary time in the woods. Almost one year, and they've got the spirit of the ***Halayt***. It's not an easy thing to do. Nobody wants to do it nowadays. When somebody is going to become a ***Halayt***, he goes off by himself. He wouldn't try to become one while he is amongst us. And the spirit finds the ***Halayt***. There were ***Halayt*** here when I was small (Jeff Harris Sr., Luus, Kispiox Elders Meeting 2/15/88).

Apparently often children who had gifts to become healers were recognized from birth and treated differently from other children. Such childen might be the reincarnation of a person who had had a spirit encounter and been a healer in a previous life. These children ate different foods and were given different training from ordinary children.[15] They stayed with their family until they were 8 or 9 years of age and each was then apprenticed to a healer. They were trained, because otherwise their power could cause harm. Their healing songs developed over time; when the initial song was complete, they were ready to heal (GWES workshop notes 3/14/91), and presumably were then recognized with a feast and given their ***halayt*** name.

However, at times, apparently, a person could encounter spirits even when not seeking them, and might then have learn how to be a ***halayt***. Barbeau's Medicine Men of the North Pacific Coast (1973:39-55) contains a remarkable narrative by a former Gitksan ***halayt*** , Isaac Tens, which explains how he became a ***halayt***, and how he used his spiritual powers to diagnose illness and to heal. For Tens, the initial spirit contact was apparently not sought.

> Thirty years after my birth was the time when I began to be a *swanassu*[16] (medicine man). I went up into the hills to get fire-wood. While I was cutting up the wood into lengths it grew dark toward the evening. Before I had finished my last stack of wood, a loud noise broke out over me, ch^{u}--------, and a large owl appeared to me. The owl took hold of me, caught my face, and tried to lift me up. I lost consciousness. As soon as I came back to my senses I realized that I had fallen into the snow. My head was coated with ice, and some blood was running out of my mouth.
>
> I stood up and went down the trail, walking very fast, with some wood packed on my back. On my way, the trees seemed to shake and to lean over me; tall trees were crawling after me, as if they had been snakes. I could see them. Before I arrived at my father's home, I told my folk what had happened to me, as soon as I walked in. I was very cold and warmed myself before going to bed. There I fell into a sort of trance. It seems that two *halaaits* (medicine men) were working over me to bring me back to health (Barbeau 1973:39).

Tens resisted the call for a while until a subsequent series of spirit encounters, visions and trance states again required treatment by ***haalayt***. Finally a chant came out of him, along with visions.

> While I remained in this state, I began to sing. A chant was coming out of me without my being able to do anything to stop it. Many things appeared to me presently: huge birds and other animals. They were calling me. I saw a *meskyawawderh* (a kind of bird), and a *mesqagweeuk* (bullhead fish). These

> were visible only to me, not to the others in my house. Such visions happen when a man is about to become a *halaait*; they occur of their own accord. The songs force themselves out complete without any attempt to compose them (Barbeau 1973:41).

For the following year, Tens remained in the care of his family, ill and unable to work, devoting his time to visions and acquiring songs. A year later, his father summoned the ***haalayt*** in the village to come. They performed a ritual to strengthen the neophyte shaman, which was paid for by Ten's father with a distribution of a large amount of property to those who witnessed the event. He was then trained by the other ***halaydim swanasxw***. He assisted at other healings, and dreamed of spirit helpers, called by Barbeau "charms" *aatirh* (***aatxasxw***), which he could call upon for help.

> I acquired charms when I attended a patient. I used a charm (*aatirh*) and placed it over me first, then over the body of the person from whom I was to extract the disease or illness. It was never an actual object, but only one that had appeared in a dream (Barbeau 1973:44).

If a person has contact with spirits and is supposed to accept and master shamanic power, he or she becomes ill until he/she has accepted the power and learned to control it. The following narrative from Percy Sterritt of Kispiox Village describes the curing ceremony of a neophyte ***halaydim swanasxw*** he witnessed when he was 14 years old in the early 1920's.

> Percy: I think she was Mrs. Walter, Walter G̲ungot [sp?]. She walked through the fire when she got up. She was in bed for damn near one year. I don't know how, they said she was supposed to be an Indian Doctor, but she won't take it. That's why she was sick. They gathered up, oh it must be about 10 other Indian doctors to help her.
>
> See that lady walk through the fire. Boy, just roll, roll the big logs open. An open fire. They packed her in on a mattress, and she lay alongside just so far from the fire. They helped her up and she got up. And right then they put that, put like a little bear skin, maybe it is a bear skin [probably a fisher skin], I guess, they put it on her back. They have that funny looking thing on their head with bear claws on it. She had that rattle, two of them. She starts singing right away. When she start singing, they open that fire up. She doesn't walk right through, she walks like that. [Percy demonstrates slow, short, shuffling steps] You could just see everything just boiling between her toes. Oooh. Red hot fire, boy!
>
> Walked right through right out to the end and nothing wrong with her feet.

> That's Indian Doctor for you. That's the thing I seen. ...
>
> She was a young lady too, well, she wasn't old. She went right on and she was an Indian Doctor.
>
> Gee, you can just see that ashes just boiling. She doesn't walk through it. She claim that she's walking on ice. That's their belief in that. She never feel that hot fire.
>
> Gee, she wasn't sick after that, either. She was sick all the time for a long time. They keep telling her--I guess she didn't want to be one of these mixed-up things. I think that's why she was sick for so long. And the minute she started she was all right.
>
> Allen: . . Do you think she would have died if she didn't accept it, being ***halayt***?
>
> Percy: I think so, I think so because my grandmother, she had something to do with that. And like, once they're into that, from the way my grandmother said that, they're into that, and they just can't leave it (Percy Sterritt, transcript 12/18/87).

Mary Johnson, Antk'ulilbixsxw, summarizes the process of becoming a ***halaydim swanasxw***:

> The medicine man practice openly. And they got, they said they used to got very sick. They almost died before they receive the power. And when they, they were ready the rest of the medicine man practice on him and make him become a medicine man. And they put, they put up a feast just among the village. And they pass moose skin to the Chiefs, enough for to make mocassins. And some merchandise. And, and they got the medicine man name. Yeah, they were just as high as the Chief name. So they are fit to practice with the rest of them (transcript, 8/2/95).

Many powers were attributed to ***haalayt***, including the power to remove objects lodged inside a patient which cause suffering. As Jeff Harris Sr., Luus, put it "If Leslie had a bone stuck in her throat and no one could get it out, the high ***Haalayt*** could take it out without opening her throat by laying hands on her throat" (Kispiox Elders' Meeting 2/15/88).

The following narrative by Mary Johnson, Antk'ulilbixsxw, of a healing which probably occurred in the late 19th century, gives information both about divination, the requirements for shamanic power, and about disease extraction.

> I was told by my, again by my Mother-in -law– about, about, about what happened in, in Kisgegas. That's where, where they came from. And she was young that time, but she never forget what she seen. And she says there's a, a young lady that was sick. Nothin' but skin and bones, she said. And, and she can't eat. So, so the night, the night before, the night before the, the medicine man will practice on her, the highest medicine man, is when they come in to the medicine man and, and they brought gifts to him. A bundle of merchandise. The merchandise, uh, moose skin, caribou skin and, and, and like, groundhog skin. And that's their merchandise. They use the groundhog skin for, for, the blankets and clothing in the wintertime. And the mountain goat skin and the grizzly bear skin and bear skin are for, for the mattresses. And, and the night before he practice, the family brought him the merchandise. And, and, he never eat supper. He fast. He go to bed without anything, and, and he looked, he–, in his dream he goes around and look into the dangerous place [***sbinax̱nok̲***]. If you happen to didn't know where the dangerous place is and if you, something frightens you, then your soul will go into the dangerous place. That's how they believe. But, but this medicine man goes around and look for it. If he finds the soul, he took it and put it, on, on himself to keep it warm. And come back home. And, and again he, no breakfast, no lunch, no supper. Then it's time for him to, to practice on the young lady. And during his really practicing, he suck. Suck on the belly. And his mouth is full of bile. And, they didn't say how many times, he spit it out. Suck again. And without opening the belly. He just suck on the outside. And– and the next day, some folks would ask, how, how the patient is. And someone said, "he[17] eats a piece of fish." ***I' lokx duut i'ix i' lokx***. ***I'ix i'lokx*** means a piece about that size, as they break it up after they toast the fish. So, those that asked the question said, "Ah," they said, "something will happen. She will get better," they said. "When she eat that small piece of fish." And she, she got better (transcript, 7/17/96).

Halaydim swaanasxw received information pertaining to the nature of illness (or other types of information) through dreaming.[18] They could also engage in a type of divination called ***gusgis gadisxw***. This involved digging a hole the size a person could put his or her face into. The hole was then filled with water. It was situated near an open fire, but not too close. The ***halayt*** is covered with a cedarbark mat ***sgana***. and looks into the water filled hole. The most powerful ***haalayt*** then could see into the ***sbinax̱nok̲***.

When the ***haalayt*** did this, they were looking for the spirit of a sick person trapped in a dangerous ***sbinaxnok***,

A ***sbinaxnok*** is a place of bad spirits, a hole in the ground, which a soul can slip into. If a person's soul, slips into a ***sbinaxnok***, he or she will die unless the soul can escape. This can happen by accident, or could happen because someone with power put the soul in there. In the latter case, the victim would see the ***halayt*** standing around the edge of the hole preventing the soul from escaping. If the spirit of the person leaves the body, it will cause illness. If the ***halayt*** was able find and free a soul trapped in a ***sbinaxnok***, the person would recover.

In recent years, the Ksan Dancers of Hazelton have carried out reenactments of the traditional shamanic healing ceremony. The scenario acted out by the Ksan[19] Dancers is the freeing of a trapped soul from a ***sbinaxnok*** when they perform the ***swanasxw*** ritual. The following description is from September 1987 when I took the role of the patient at a re-enactment for a workshop on shamanism held by Medical Services Branch of Health and Welfare Canada in Prince Rupert.

> The patient [myself] lies down on a gray blanket. She is covered with a second blanket to the chin.
>
> The patient is [supposed to be] mortally ill. The spirit of the person is falling down a black hole. Just the hand is still clinging to the edge. The shaman is trying to grab the hand and pull the patient's spirit back out of the hole. If the ***halayt*** cannot do this and the person's spirit falls in, they will die. The ***halayt*** is not strong enough to bring a person back if they fall all the way in.
>
> [The ***halayt*** approaches the patient. Sadie (the woman taking the role of ***halayt***) wears a grizzly claw crown and an apron with fringe and tinklers. She places a ?fisher skin diagonally over the heart of the patient].
>
> The ***halayt*** circles around the patient. Women beat rhythm with sticks at the same time. The ***simhalayt*** song would also be sung now. Victor or Vic Reese [other participants in the enactment] drum lightly and quickly.
>
> The ***halayt*** rattles vigorously with a round rattle. This forces the intrusive spirit to the patient's mouth. Sadie catches the spirit in her hand. Usually Sadie gives it to the 2nd woman ***halayt*** to blow away. This time she will blow it away because she has no partner. She rattles vigorously around the patient. Then the blanket is drawn back and the patient rises to sitting. The patient then gets up and "jumps around" after Sadie (notes, 9/23/87).

The re-enactment described above lacks the dramatic fire-walking or the preliminary divination to locate the endangered soul, but gives a sense of the actual work on the patient and the logic of what is being done by the ***halayt***.

Mentioned in accounts by living elders, in the Tens narrative, and in the analysis of Gitksan shamanism given by Guédon (1984) are the spirit helpers or "charms" of the shaman, variously rendered ***aatxasxw***, *aatirh*, and *atiasxw*. These entities, which may be acquired in dreams, as mentioned above in the quotation from Isaac Tens, serve as a focal point for power in healing. Guédon explains her understanding of the spirit helpers:

> One of the first Tsimshian women I have met who is still involved today in shamanism has explained to me that it is not the *atiasxw* as object that matters but the methods used to place the power in proper focus with the help of the *atiasxw*. One may think that a rope can be used to tie or to pull, but hers it not a material rope, it is an *atiasxw*, that is, as she explains it, a "point of view." If she is looking at a sick person in a normal way, she knows she cannot get through...there is nothing she can do to help the person. Her idea is to shift the point of view: she would imagine herself as a rope... 'As a rope I can do something. I can be there as a rope and there would be that other rope (the patient) with a big knot (the disease)'...(Guédon 1984:204).

In Ten's dramatic narrative of the healing of a chief's wife, he saw his Otter canoe ***aatxasxw***. The woman he was treating was among the passengers in the canoe.

> By that time, about twenty other *halaaits* were present in the house. To them I explained what my vision was, and asked, "What shall I do? There the woman is sitting in the canoe, and the canoe is the Otter."
>
> They answered, "Try to pull her out" (Barbeau 1973:45).

Tens asks that they spread out the fire and he walks up and down the pathway between the logs four times while the other *halaaits* are singing.

> Then I went over to the couch on which the sick woman was lying.
>
> There was a great upheaval in the singing and the clapping of drums and the sticks on the boards. I placed my hand on her stomach and moved round her couch, all the while drying to draw the canoe out of her. I managed to pull it up very close to the

> surface of her chest. I grasped it, drew it out, and put it in my own bosom (Barbeau 1973:47).

The canoe/Otter serves as a visualization technique and focal point of power. The disease is transmuted into the canoe, which can be manipulated by the ***halayt***; its spiritual power is taken into the ***halayt*** who is able to master it. According to Tens, two days later the women rose out of bed and was cured.

According to modern elders, the ***aatxasxw*** of a ***halayt*** might be of various forms: a weasel or other animal, or a glacier. The elders suggest that the reason that the ***halayt*** can walk through the fire without harm is that "they may have a spiritual helper that is a glacier. When they go in the fire they don't get burned, they feel cold" (Jeff Harris Sr., Luus, translated by Norman Moore 2/15/88). Another narrative of Jeff Harris' involved the conversion of a group of ***haalayt*** to Christianity at Gisgaga'as. In this instance, the ***haalayt*** all converged to assault the missionary, hurling their ***aatxasxw*** at him. If they were successful, he would be injured wherever the spiritual helpers hit or bit him. However, this man had strong spiritual power, and was surrounded by a 'cone of light'.

> If the spirit animal bit the missionary, or the arrow pierced him, he would die from the spiritual assault. But the missionary was protected with a "cone of light" from his own goodness. Each ***halayt*** unsuccessfully sent his spirit helper to attack the missionary, but none could reach him. When they could not defeat him, they concluded his power was greater than theirs and they converted to Christianity (Bev Anderson notes 6/05/87).

A narrative by Mary Johnson (Antk'ulilbixsxw) of a life-threatening illness when she was a young woman illustrates the concept that where an ***aatxasxw*** attacks one is the site of illness and pain:

> This is the second time I had operation. And Doctor, Doctor Wrinch, said that I won't pull through. But,... Dr. Wrinch he said he's young and he knows more than I do. So after I woke up, and this happened in the afternoon. All the many windows in the hospital, and it's very bright. ... Oh, before this happened, after, right after the operation, I have seen a a hand. It's just a hand. Fingers, it's, it's nothin' but skin and bones. And it clutches where I had the operation. And, and I was helpless. I want to take it off and throw it away, but I can't. I-I just see it in a vision (transcript 7/17/95).

Later in the narrative Mary elaborates on the nature of this hand:

> So when I come home, my mother-in-law. This is Edith Ga'wa's grandmother– she's a medicine woman herself. And she ask me a question when I come home. "Did you dream of anything?" she said, "You've been sick for a long time." "No, I didn't dream" I said, "I just see in a vision the, the fingernails, just the palm of the hand." And then she sat down and, really surprised. She said "Only the highest medicine man will, will dream about that," she said, "because it's, it's the supernatural spirit for the medicine man, and they also use it as a witchcraft too," she said (transcript, 7/17/95).

Among the causes of illness is "witchcraft" or evil sorcery, as mentioned above. If the "witchcraft box" cannot be found and the link to the victim (hair, fingernail parings, a piece of the victim's clothing) removed from the contaminating influence of the polluting materials found in it, then the victim will die. The ***haldawgit*** could remove the materials and cancel the evil magic; indeed, some were reputed to use this as a means to extort wealth from putative victims. Or, as in the narrative that follows, the ***halayt***, with the aid of his spirit helpers, was able to divine the cause of the illness and location of the witchcraft box, and then his helpers retrieved the witchcraft box so it could be destroyed.

> There once was a ***halayt*** from this village, his name was (Hleek). I guess he's a wolf. He had a daughter. This young girl got sick. This ***halayt***, night after night, he wanted to dream what happened to his daughter. Nothing happened. He couldn't see any visions or anything about it. So this girl got worse. One night Hleek let her, he put his (***hlak̠s***) headpiece, he put a lot of down in it, he put it upon her head and all the other ***halayt*** paraphernalia, and went to sleep. You know these hoofs, the hoofs of maybe a moose or a deer, that they use on a ***halayt*** belt (***ambilan***). That night, I guess they were fishing up the river, that night he heard the shuffling of the (***ambilan***) in his dream and he woke up and looked around and looked at where his daughter was, and she was not there. He looked around and there he sees where eagle down dropped when she went on that trail, and it goes up the river. There's a creek that runs in there, what do you call that creek, (Xsinjihl "Caribou Creek") is the name. That's where the eagle down went up. This eagle down turns off where the creek is and went that way and there was a waterfall there. You know how a waterfall is, they run a little bit off, not straight down. That's where this eagle down went in and Hleek looked in, went in, and there was a little box there, witchcraft box. That is in his dream, and he woke up in the morning. You people talk about ***halayt***, that's why I tell this. And he asked the people up there to build the

> fire real hot. You know, the big piece of logs, and make it real hot. After it was real hot, he told them to part the wood (fire) and he went in with his (*gwiishalayt*), into the hot fire, into the ashes. He covered himself up and he stayed in there for half a day. When he got up, he got a box with him, that witchcraft box. There are things they call (*aatxasxw*) maybe it sounds funny, but it's true. These are the things that brought the witchcraft box home (*aatxasxw*). Something like a weasel or something. It's a spiritual thing. The naked eye could not see. This young girl got better, she got healed. Said there were two brothers from Kisegaas who wanted Hleek to go up there because they were getting sick. But he didn't want to go. Them are the ones that caused that girl to get sick through that witchcraft box. I got this story from Johnny Johnson, it was told to my father. It is true. It's not just a comic story, it's a true story. A high *halayt* would do anything to heal people, and they got something out of it. It's called (*gi'nim*), their reward for doing that (Jeff Harris Sr., Luus; Norman Moore translator, Kispiox Elders Meeting 2/15/96).

Modern Gitksan people assert there are no longer any true ***halayt***, because the tradition died out and no one today has the necessary self-discipline, nor the teachers, to revive the tradition.[20] However, various less complete forms of traditional spiritual healing which can be done by the non-specialist do persist and are used in conjunction with other forms of healing provided by doctors, hospitals, clinics, and counsellors or other mental health professionals.

Reincarnation and Ancestral Spirits

The Gitksan, like many other Northwest Coast peoples, are strong believers in reincarnation (Mills 1988; 1994a,b; Harris 1994). The Gitksan believe that reincarnation is frequent among their people; it usually occurs in family lines, and often within the matrilineage. Gitksan believe that dreams can announce the identity of the baby who will be born. Young children may also show memories, or recognize friends, places or activities which their previous incarnation was familiar with. The identity of the returned person is often inferred from such signs. In addition, the reincarnated person may have a predisposition to illness or a handicap (Mills 1994b) which has its origin in accident or illness in the previous reincarnation. This may be used as an explanation of a particular birth injury or serious illness. Injuries to the previous incarnation are believed to leave tell-tale birthmarks, which can also aid in determining the identity of the baby.

The Gitksan also believe that ancestral spirits may be near, such that they can be spoken to, or consulted for advice. The narrative given by Mary Johnson previously about her own life-threatening illness and hospitalization, illustrates a particular variant of this theme: after her surgery, when she was very weak and in pain, she had a vivid vision of her Great Grandmother entering the ward, dressed in her ***gwiishalayt***, walking erect (not bent over as she had as a very elderly woman). The Great Grandmother gave her porcupine meat to eat. Mary remembered fearing she would die because she took food from a ghost (Interview notes 7/15/94). But actually, the vision of the Great Grandmother brought healing. Mary's mother-in-law, the grandmother of ***halayt*** Edith Ga'wa, explained to her that the Medicine Woman had come to heal her:

> And, and I told her about Grandmother. And she said, 'The ghost of the medicine woman sees you are suffering,' she said. 'That's why she came to help you.' The porcupines are a supernatural spirit in the medicine woman or medicine man. They sing about the porcupine (transcript 7/17/95).

Treatment of Proximate Causes-Working on the Body

Although in some sense the ultimate cause of all illness lies within the realm of the spiritual and in lack of harmonious relations between the person or related people and other "Real Persons" or beings in the world, one can also examine Gitksan concepts of proximate causes of illness or injury. I have inferred Gitksan concepts by examining people's statements about the nature of illnesses manifested in suggestions for various possible forms of treatment for the condition, and informal dialog about illnesses and possible causes. Cleanliness, as mentioned above, is key to conceptualizing the disease process in many instances. Enhancing the flow of blood in the body is also seen as vital. After cleansing, strengthening the blood by drinking broth from fish or meat is seen as aiding the healing process.

Cleansing the body takes place through several different means: use of purgatives or emetics, sweating in the sweat hut (possibly aided by use of herbal teas which enhance sweating), bathing in cold water or herbal decoctions, and fasting while drinking water or herbal teas to eliminate poisons through the urine. Some herbal remedies of European origin are readily accepted by Gitksan people, because they make sense in terms of these concepts of cleansing.

Injuries such as fractures, cuts, and burns are treated in ways which repair mechanical damage, promote healing, and reduce inflammation or infection. As mentioned in the previous chapter, cuts or burns may be treated by dressings of pine pitch, which is antiseptic (see Chapter 7). Burns may be treated with oolachan grease, which serves to reduce drying of the exposed flesh. Sores are treated with medicinal salves compounded of pitch and/or grease with herbal components pounded in them. Fractures were set, and immobilized with bark casts. Chronic conditions such as arthritis or rheumatism are also treated by (postulated) anti-inflammatories (e.g. yellow pondlily rhizome poultices) and by counter-irritation, including moxabustion, as well as by systemic tonics or sustained use of oral medications (e.g. devil's club based teas). Skin conditions are treated with herbal baths or topical emollients such as bear fat or salves. Stomach complaints are treated with emetics (to cleanse the stomach and remove indigestible residues) or with soapberries, which contain saponins that react with grease and fat.

There is a great deal of use of general "wood medicine[21] " decoctions as tonics, and as treatments for "sickness" (such as "flu", colds, and more serious conditions like bronchitis or TB). There are also specific medicines designed to promote appetite and strengthen a sickly person such as one who is suffering from TB (see Chapter 4 for examples).

In addition, manipulation of bones to heal fractures and severe dislocations was practiced. There were apparently specialist healers who were skilled at bone setting.

> Another famous cure ...involved Jonathan Johnson. He died only recently. When he was a young man in his mid-twenties he suffered dislocation of his hip because he was bucked off a horse while mounting. He lay all winter in pain, unable to walk. Finally Mrs. Lewis Wesley [a skilled healer and bonesetter] went to see him. She said she thought she could help him, but it would be the most painful thing he had ever experienced and it might not work. Was he willing to risk it? He said yes, he had lain all winter in pain anyway. So she laid him on his side with the bad hip upward. She laid a plank over his hip. Two men jumped on it. The first time it didn't work. Was he willing to try again? Yes he was. The second time it

> went in, and he was able to walk soon after. He lived to his mid seventies (GWES Workshop Notes 3/14/91).

Casts were constructed of heated hemlock sapling bark to immobilize fractures until they healed. Yellow pondlily rootstock might be used in conjunction with other treatments to aid in healing. This may be due to anti-inflammatory properties of the rhizome (see Chapter 7).

Midwifery involved use of various skills including external version[22] for difficult presentations. The scant anecdotal information collected about specialist midwives suggests they were sensitive judges of progress in labour. Reportedly Dr. Wrinch, the missionary doctor who first practiced at the hospital in Hazelton, used to call Mrs. Lewis Wesley from Kispiox to deal with difficult births at the hospital. According to elders, she delivered every baby in Kispiox for years (GWES Workshop Notes 3/14/91).

Normal childbirth apparently often happened in the home context. The few accounts I have heard of childbirth outside of hospitals in the mid-twentieth century are home births; birth attendants were not mentioned by my consultants, although the use of purgatives like castor oil was mentioned by one lady.

During their pregnancies women received counselling by various older female relatives, and there were some taboos governing handling and eating of red meat. Women I spoke to remembered this as a special time of sharing. After birth, babies were seen as very impressionable; washing their clothing separately from adults was very important to avoid contamination by spiritual residues from older, less clean souls (GWES Workshop Notes 3/14/91).

General anatomical knowledge was not systematically investigated, although people clearly had terms for internal organs such as stomach, intestine, gall bladder, bladder, heart, lungs, and for bones, skin, genitals, and various externally identifiable body parts. People make reference to stomach, lungs, gall bladder and heart and blood when describing ailments or suggesting strategies to cure them.[23] Because I am not fluent in Gitksan, elders usually gave these terms in English when speaking with me; however, some terms were given in Gitksan when translators were present, or when Beverley Anderson was the interviewer.[24]

Gitksan Illness Categories-Nosology

Michel Perrin in his monographic work on Guajiro medicine (1986) constructs a detailed chart depicting Guajiro disease concepts, and gives indications of diagnostic criteria and treatments for these classes. While such an extensive treatment cannot attempted here with the information at hand, a general schematic of Gitksan disease classification may be presented, together with some details of types of disease recognized by modern Gitksan people. This type of analysis does not represent a Gitksan approach to healing knowledge, but is useful for purposes of comparison.

I will base the discussion on the time period when today's elders were young, and just prior to their births, that is, on the time period from about 1880 to roughly 1995. For the moment, I will exclude very recent conditions such as AIDS, which the Gitksan are certainly aware of. In the Gitksan view, one could say that ailments or bad luck may be due to spiritual causes such as taboo violation, lack of "cleanliness", being witched, an encounter with a spirit, soul loss, spirit possession or contamination, or "medicine song sickness". In addition, as discussed above, a classification of disease or injury types can be made by looking at physical symptoms. This type of two tiered system somewhat resembles the Guajiro system referred to earlier (Perrin 1986).

In the course of interviews about traditional medicine and healing, various disease conditions were referred to by name. Tuberculosis is described by two different Gitksan words ***x̱'yansxw*** "eat leaves"and ***x̱yahlx̱w*** "eat mucous". These terms may not be complete synonyms, but may describe symptoms or disease conditions originally considered separate; in one description of the illness of a particular man the English term TB was used, along with the implication that he was suffering from both ***x̱'yansxw*** and ***x̱yahlx̱w***.

> Some of us have seen, a lot of us have seen late John Brown, he's from this village, but he lives at Kisgegas when he was young... And he's dying of both (***x̱yahlx̱w*** and ***x̱'yansxw***) and they dry the devil's club, like Jeff said, small sizes, just enough to chew it and swallow it. And he's old when he died. Devil's club cured him (Kispiox Elders Meeting transcript 2/215/88).

Although perhaps not anciently present among the Gitksan, TB was certainly epidemic in the earlier part of this century causing high mortality and higher morbidity. Many of the consultants I spoke to had been TB survivors.

Arthritis ***gaxsibit*** (Kispiox Elders Meeting Transcript 2/15/88) and rheumatism are prevalent among older people, and various different remedies were given for these conditions. The term ***mathlatwix*** was translated as jaundice or gas by Beverley Anderson (David Green Interview Notes 2/20/87). The health of the heart was mentioned by a number of consultants; the Gitksan term ***alhla h'ootx*** was translated as heart attack (Pete Muldoe Interview notes 11/23/87). ***Godalolx***. (Peter Martin Notes 1/19/88,) mentioned above under spiritual ailments, was a disease condition which involved facial contortion; the elder who described its treatment considered that it was possibly equivalent to stroke. Epileptic fits ***ma'uul*** "acts like a bear" were also named; they were believed to come from violation of a taboo against eating bear cubs.

Cancer and diabetes are terms which are used to describe illnesses by modern Gitksan, and for which there are specific medications, along with other ubiquitous modern Western folk illness categories, colds and flu. Terms for conditions like excema and headache are also used. These terms I have only recorded in English, so I am uncertain of their relationship to Gitksan language illness terms. The term influenza was also used by the Gitksan in the 1920's (Smith n.d.), not surprising in terms of the recently suffered 1918 flu epidemic. Gonorrhoea also occurs as a disease term in Smith's manuscript, reflecting perhaps the prevalence of the condition after white contact and before effective antibiotics. General descriptive terms like sore stomach are also found, and terms like eye medicine, tonic, cleanser, or blood cleanser, are used in describing the ailments one can treat with various medicinal preparations.

Although this is a very cursory examination of Gitksan disease categories, some significant differences between Western biomedical approaches to disease and Gitksan conceptions can be readily seen. Leaving aside for the moment spiritual aspects of disease causation, Gitksan conceptions either describe specific symptoms, or view general health or illness. Western biomedicine tends to describe pathology in terms of organs effected (e.g. pancreatitis) or pathogens (e.g. staphylococcus infection). Sometimes the biomedical terms imply both a set of symptoms or organs effected, and a pathogenic agent (e.g. bacterial meningitis, scarlet fever, strep throat). Unsurprisingly, in view of the lack of technology for a Gitksan bacteriology, and also the relative paucity of infectious epidemic diseases, such terms are lacking from Gitksan descriptions of disease. Gitksan terms do not differ in scope reference from the disease categories in use in Europe before the modern revolution of bacteriology, microscopy and molecular biology. Descriptions of clusters of symptoms are also retained in modern biomedicine where the cause of the condition is not understood by the diagnostician; terms like "myofascial pain syndrome", or "idiopathic epididymitis" are not really different in kind from "sore stomach".

Discussion

In precontact times, accidents, warfare, starvation, food poisoning or gastrointestinal illnesses, internal and external parasites, aging, respiratory illnesses, difficulties in childbirth, and cancer were the main types of physical illness the Gitksan experienced. Emotional or mental illnesses[25] were doubtless problems that afflicted the Gitksan like all other human populations. Certain broad classes of illness were not prominent among the Gitksan before European contact; specifically, many epidemic diseases of viral or bacterial origin were largely absent in the New World (Dobyns 1993; Newman 1976). Plague, cholera, smallpox, and influenza were all absent from the Gitksan health picture. Diseases like gonorrhoea, syphilis and tuberculosis were probably also absent or much less frequent in this area, though they may have existed in the New World (Cybulski 1990). Many new diseases began to afflict the Gitksan with the incursion of people of European (and Asian) origin into Northwest North America, contributing to disruption and weakening of indigenous societies, and impacting both their spiritual beliefs and medical practice, as they responded to diseases and causes of death they had not encountered before. The missionaries were not slow to link spiritual potency and healing; many early missionaries were medical doctors, or at least gave out such medications as were common in their day while combating the spiritual power of the indigenous healers. In part, at least, this contest took place on the plane of efficacy in healing. Northwest Coast shamanism was eclipsed both by direct confrontation with the spiritual powers of European missionaries and by the intractability of the new diseases which accompanied, or even preceded, contact, to traditional treatments.

However, underlying conceptions of health and disease remain, and the modern Gitksan synthesis retains many aspects of traditional understandings. Gitksan embrace effective treatments for newly encountered diseases from biomedicine along with both traditional and alternative approaches to treating illness. Many of the diseases of the last quarter of the twentieth century of both Native and non-Native North Americans are of a diffuse nature which are difficult to diagnose and treat by either surgery or antibiotics, the two greatest areas of success of the mechanistic body-based model of health that is the foundation of biomedicine. Cancer, depression, anomie, schizophrenia, suicide, substance abuse, family violence, lupus, rheumatism, chronic pain syndrome, and chronic fatigue syndrome are among the conditions which afflict Native people in sometimes disproportionate measure to their percentage of the population, in part because of their "colonized" and economically disadvantaged position. These elusive causes of dis-ease are subtle and pervasive, and inspire Gitksan along with other North Americans to seek other forms of treatment and understanding of such conditions than standard biomedicine.

Summary and Conclusions

The Gitksan view of health and the disease process can be summarized as viewing a healthy body as one which is clean and in balance, in which one's personal power and discipline are sufficient to meet one's obligations and resist temptations that weaken one and make one vulnerable to disease and misfortune. If a body is not healthy, attempting to restore the clean state by use of purgatives or emetics to clean physical "junk" out of the body, and spiritual practices designed to cleanse spiritual "junk" or dirt enable the body to recover its own balance and strength. Diet plays a significant role in this restoration, especially strengthening foods like wild meat or fish broth, or dried fish. Herbal medications which aid appetite may be required to help regain strength and restore function. Cleaning the blood and enhancing the flow of clean blood are also seen as central to the healing process.

The Gitksan approach to treatment of illness is gradual and systemic, and involves diet as well as toning and cleansing herbs. Such treatment may take a while to yield results, but can alleviate many conditions including those refractory to western medical treatment like cancer, diabetes, arthritis, and what we would call mental illness. European and Eastern herbology, because they are seen to be based on similar holistic understandings of mind/body/spirit, and involve the use of plants seen to be cleansing or powerful, are attractive adjuncts to both traditional and Western medical treatment. Faith healing, usually in the Christian tradition, and Cree or Plains style sweats are also widely pursued, and appear to have replaced active specialist shamanic healing in the Gitksan tradition. Other less mainstream treatments like homeopathy and Philippine psychic surgery are also selected by individual Gitksan. These too have resonances with traditional Gitksan approaches to healing; the concept of potency on a non-material plane which is more significant than the material for true healing links homeopathy with traditional practice, and psychic surgery is very similar to the traditional disease object extraction practiced by Gitksan and other Northwest Coast shamans.

The most fundamental Gitksan approach to health is preventative: right living, purification, balance of mental, physical and spiritual activity, self discipline and self control, along with appropriate diet and the use of tonics and cleansing medicines are the Gitksan way of achieving and maintaining health. Living in balance and in an appropriate way brings health and good fortune. Failing to live right brings imbalance, bad "luck", poor health and poverty.

Notes

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[1] As Seguin (1984) has said, things in the non-human realm are in their essence persons (what she calls Real Persons), as are humans. Seguin also discusses hierarchies of reality, and underscores the fact that Real Beings are those of high status, as human chiefs (Real Man), and the essential manifestations of animal species, cf. the Chief of the Spring Salmon, mentioned in an *adaox* originally recorded by Boas (1916).

[2] Gitksan people may object to the term "luck", which, in English, has a connotation of random happenings which are outside of the control of the people involved, although this is the term commonly used by Gitksan speakers in English. The Gitksan term translated by "luck" does not have any connotation of randomness. A person who is disciplined in effect makes his/her luck, and a person who lacks discipline creates his or her misfortunes.

[3] As Seguin explains for the Coast Tsimshian of Hartley Bay,

> Generally when an accident happened to a Real Person, distributions of property served to inform other Real Beings that *any defect had been remedied* and were *part of the cure*, along with *increased self-discipline*. The person is said to *gilks yooks* (wash oneself) (Seguin 1984:118, emphasis added).

Again, the response to accident is metaphorically expressed in terms of *cleansing*.

[4] According to Heather Harris, the English word 'power' can translate two distinct concepts in Gitksan: ***halayt*** and ***dax̲g̲yet***. ***Dax̲g̲yet*** is a kind of pervasive power which all persons can potentially have. Depending on one's behaviour and self-discipline, one's ***dax̲g̲yet*** will be higher or lower, and one's success and fortune correspondingly better or worse (personal communication 1994). ***Dax̲g̲yet*** is also the term used to describe the mutually empowering relationship of people and their territories. Sometimes it is translated as "empowerment". ***Halayt*** suggests a distinct kind of power possessed by Chiefs and shamans, who have contacted and gained power from the 'supernatural' realm (Harris 1994 personal communication; Guédon 1984a). Bruce Rigsby (personal communication

1997) points out that the term for a shaman's power is, in fact ***dax̲gathl halayt***, and that the term ***halayt*** properly refers to a shaman, a person, not a type of power. However, there may be the concept that the power of a ***halayt*** or ***Si'moogit*** differs in kind rather than simply in degree from power in general.

[5] The term mountain here probably indicates both a physical mountain and its metaphoric extension as a hunting and/or berrying area.

[6] ***Haldawgit*** is usually translated as sorcerer or witch, and the mechanistic magical practices of the ***haldawgit*** as 'witchcraft' by local people and in the literature on the Northwest Coast. The ***haldawgit*** is more of a sorcerer, a deliberate worker of evil magic, than a witch in the terminology of Evans-Pritchard (1937).

[7] The term ***halayt*** refers to power derived from "supernatural" sources; a Chief is also a carrier of power; his headdress is called ***amhalayt*** 'good for power', and his dance blanket (usually called in English "Chilkat blanket") is called ***gwiishalayt***. Secret Society members were also ***halayt*** (Guédon 1984a). The healer might be referred to as ***halaydim swanasxw*** [roughly power of breath] or ***swanasxw halayt*** (Guédon 1984a,b), or simply, as in the Isaac Tens narrative (Barbeau 1958), as ***swanasxw*** 'breath'.

[8] When speaking English, Gitksan people sometimes refer to the practitioner, as well as the practice, as "witchcraft."

[9] Fasting to gain power and contact the spirit realm is a common technique of shamans. Solitary fasting to gain power is eloquently described in Jenness 1955 for a Coast Salish shaman, and is discussed in De Laguna 1972 and Emmons 1991 as a central aspect of Tlingit shamanism.

[10] This literally means "one who eats dirt" (Bruce Rigsby, personal communication 1997).

[11] The English plural marking -s is here used with the Gitksan term; this is heard in spoken English with Gitksan consultants when they use the Gitksan word rather than Medicine Man, and for simplicity, I have used it in this text without a change in type-face.

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[12] This is the river otter *Lontra canadensis*, not the sea otter *Enhydra lutris*. The anthropological literature refers to these animals as "land otters."

[13] In another telling of the same tale, the substance ingested was supposed to be the vagina of the otter, which contained the ejaculate of the male victim (4/28/87). Possibly Mary edited the tale to avoid offending me in the later telling.

[14] I attended a modern Cree-style sweat in the summer of 1994, where the other participants were Gitksan health providers of the Hazelton area. In this sweat, run by a woman called Scheran who was a pipe carrier in the Cree tradition, the water splashed on the rocks during the sweat was a mixed herbal solution which created an aromatic steam.

[15] This information is similar to that given by Emmons 1991 and De Laguna 1972 for the Tlingit, where children who would become shamans ***yikh*** were not given foods such as shellfish which were prohibited for shamans, and never had their hair combed. If an adult shaman's hair were cut or combed, his power would be destroyed.

[16] Where the spellings of Gitksan words in the literature do not conform to the modern practical orthography, I have retained the original spelling in italics. Terms given in bold-face italics are spelled according to the modern practical orthography.

[17] Gitksan does not mark gender in pronouns, and elders may sometimes choose the male pronoun in English when referring to women.

[18] Apparently in Gitksan, the dream state while sleeping and a trance vision state are not distinguished as different types of states (Guédon 1984a, b), and dream experience is accepted as valid and real.

[19] Ksan is a reconstructed village on the site of the old village of Gitanmaaxs beside the confluence of the Bulkley and Skeena Rivers. It houses a national exhibition centre, with a small permanent collection of chiefly regalia and other artifacts, which can be removed for appropriate use by their legitimate owners, the Kitanmax School of Indian Art, a gift shop, and reconstructed longhouses and totem poles of the pre-contact and

contact periods. In addition, there is a dance group which performs traditional dances and songs, with permission of their rightful owners, including ***nax̱noḵ*** and healing performances.

[20] However, Alice Jeffries, who was working with the Health Transfer process in 1994, was apparently interested in reviving the tradition, and it was felt that some people in the community remembered enough that a reconstruction of the techniques of ***swanasxw*** might be possible (Harris 1994).

[21] "Wood medicines" are described in Chapter 4. These are mixed medicinal decoctions, mostly composed of several types of tree and shrub bark, perhaps with juniper or spruce tips.

[22] External version is the turning of the fetus in the womb by a birth attendant. This skill reduces complications of delivery and potential maternal or fetal mortality caused by improper presentation: breech (feet first) or transverse lie (cross-wise position of the fetus). Breech births carry significantly more risk to the fetus from possible strangulation by the umbilical cord, and from the longer period in the birth canal. If transverse lie cannot be corrected, birth cannot take place, and both mother and fetus will die, except in modern antiseptic hospital situations where delivery can be made by Caesarean section.

[23] A number of general anatomical terms are also found on various word lists, but I have not reviewed these here, because the context of use and accuracy of glosses cannot be determined at this point.

[24] Beverley Anderson was co-investigator in the early part of this project; she also directed the Traditional Medicine Program of the Gitksan-Wet'suwet'en Education Society, under whose auspices the initial part of this research was conducted. Beverley is fluent in both Gitksan and English, and has a Bachelor of Nursing in Public Health. Her background in health science may influence the choice of English glosses for Gitksan words in some instances.

[25] I would also include spiritual ailments here; we lack a neutral term to designate the spiritual aspect of illness in modern English usage, because

spirit is explicitly excluded from the empiricist perspective embodied in modern medical science.

Chapter 7

Pharmacognosy of Gitksan Medicinal and Food Plants

In any study of medicinal plant use, an examination of what is known about the biochemistry and pharmacology of the plants may shed light on the potential efficacy of the plant preparations, and on the physiological effects that applications may produce. In this chapter I will review the literature on natural product pharmacognosy to present what information exists to date on the composition and potential clinical effects of plants used as medicines or foods by the Gitksan.[1] Where studies on the species used by the Gitksan have not been done, I present data on closely related plants likely to have similar chemistry and properties. The information is organized as a series of short sections, each dealing with one plant. A brief review of the nutritional and medicinal aspects of plant foods follows the discussion of the pharmacognosy of medicinal plants. The discussion of nutritional aspects of Gitksan food plants is based on Johnson Gottesfeld (1995), which is a review of the role of plant foods in the Wet'suwet'en diet. The Wet'suwet'en live immediately to the south and east of the Gitksan territories, and eat virtually an identical array of plant foods.

Overview of Compounds found in Plant Medicines

A number of types of compounds with biological activity are found in plant-derived medicinal preparations. Principal groups of compounds include alkaloids; volatile oils and resins, saponins, glycosides, steroids, and triterpenoids; phenolics, tannins, flavonoids, anthocyanidins and coumarins; and various mucilages. Other compounds found in plants are various polypeptides, proteins and amino acids, lipids, and various carbohydrates. Nutrients, particularly vitamins and minerals, are also found in medicinal plants, and compounds with biological activity may also be found in plants considered primarily as foods or beverages (Etkin 1994; Etkin and Ross 1983, 1991; Johns 1990). Here I will review compounds which are non-nutritive which have biological activity with potential therapeutic relevance, or which are frequently reported in the compositions of medicinal plants.

Alkaloids are organic compounds which contain at least one nitrogen atom, usually as part of a heterocyclic ring. They tend to have high biological activity, although their function in the plants which produce them is obscure. Some authors have argued that they act to deter herbivory because of their toxicity. Many important plant medicines owe their action to the presence of alkaloids. The opium poppy contains numerous alkaloids, including the potent pain killer morphine, which have widespread physiological effects. Another potent alkaloid is colchicine, derived from the autumn crocus, which arrests cell division at metaphase, killing dividing cells. The tropane alkaloids of *Datura* and related species in the Solanaceae are used as sedatives to produce "twilight sleep", once a common obstetrical procedure, and to treat motion sickness. Some alkaloids are strongly psychoactive; these include compounds such as mescaline, derived from the peyote cactus, and muscarine, from the fly agaric *Amanita muscaria*. *Datura* alkaloids like atropine are also psychoactive (Trease and Evans 1983). Other alkaloids, such as quinine from the bark of the *Cinchona* tree have other therapeutic properties; quinine is the most effective traditional drug to treat malaria. And, of course, two of the most commonly used plant drugs in the world today owe their activity to alkaloids: tobacco, which contains the addictive and neurologically potent nicotine (also useful as an insecticide), and coffee, which contains caffeine, a general stimulant with action on many body tissues.

Many alkaloids are toxic (Kingsbury 1966), and in excessive doses, potentially lethal, requiring care to administer enough active compound to be biologically effective, but little enough to avoid killing the patient. The relationship between the level at which a drug produces activity, and the level at which it becomes unacceptably toxic is the therapeutic index[2] (Kalant and Roschlau 1989).

Terpenes or terpenoids are diverse and widespread organic compounds comprised of chains or rings of five carbon isoprene molecules (Greulach 1973, Mann *et al.* 1994). Saponins, steroids, carotenoids and triterpenoids are all types of terpenoids. The physical properties of terpenes are variable depending on their composition. Terpenes composed of two to four isoprene residues are mostly volatile oily liquids. Pinene and camphor are both simple terpenes composed of two isoprene residues (Greulach 1973). "Essential oils" are mostly terpenes, including such familiar flavorings and scents as lemon, peppermint, rose and lavender oils. Terpenes composed of six isoprene units are resins; synthesis of resins are mostly limited to conifers (Greulach 1973). In the economic sense, resins are polymerized terpenes, generally mixed with volatile oils. Resins are insoluble in water. They are actively synthesized into specialized canals or ducts in the plants which produce them (Simpson and Connor-Ogorzaly 1986). Many trees in the pine family such as pine and spruce secrete resins, which are often referred to as pitch or gum. These compounds help to seal wounds and combat pathogens in the trees; they may also deter herbivory. Carotenoids are pigment molecules which are composed of eight isoprene units, and are universal in higher plants, and present in some fungi (Greulach 1973).

Several important kinds of biologically active terpenoids belong to a broad group of complex molecules composed of a sugar complexed with a non-sugar portion, or aglycone, called glycosides. These compounds are called glycosides, because on hydrolysis, a sugar and a non-sugar component are produced. Sometimes the term glucoside is also encountered; this simply means that the sugar portion of the molecule is the familiar simple sugar, glucose. Saponins, steroids, and cardiac glycosides are all medicinally important types of glycosides. Cyanogenic, or cyanide-producing, glycosides are important plant toxins.

Saponins are organic compounds which produce a foaming action in water (Kingsbury 1966:32). Hence the name, which is from the Latin word for soap. The active compounds of the widely used ginseng species are saponins. Saponins are widely distributed in various plant families, including in legumes such as alfalfa (Birk and Peri 1980), in plants in the spikenard or panax family such as the various species of ginseng (Shibata 1977), and in the food and medicinal plant soapberry, in the Eleagnus family (Turner 1981). They are also distributed in monocotyledonous families such as the yam family, the amaryllis family and lily family (Shibata 1977; Trease and Evans 1983). The non-sugar portion, or aglycone, of a saponin can be steroidal (tetracyclic triterpenoids containing four ring structures, one of which is a five carbon ring or sterol group), or can be pentacyclic triterpenoids (Trease and Evans 1983) with thirty carbon atoms (Kingsbury 1966).

Saponins may be hemolytic when ingested, and are highly toxic when injected into the blood stream (Birk and Petri 1980; Bisset 1991; Trease and Evans 1983). Many saponins have useful anti-fungal properties (Bisset

1991); in addition, anti-inflammatory activity is shown by mixtures of saponins from a variety of different plants (Shibata 1977; Bisset 1991). Saponins may improve absorption of other medicinal compound such as antibiotics or insulin, when administered together (Bisset 1991). Steroidal saponins such as those found in the tropical yam genus *Dioscorea* have been the source of steroid used in the synthesis of birth control pills and cortisone. Commonly occurring plant steroids include stigmasterol and ß-sitosterol.

Certain plants, such as spreading dogbane and foxglove, produce cardiac glycosides, steroidal glycosides which have a strong action on the heart and are fatal if taken in too large a dose. Digitoxin and related compounds are the cardiac glycosides found in foxglove, *Digitalis*, and form the basis of treatments for congestive heart failure, although their toxicity makes careful monitoring of dosage and effects mandatory.

Other types of glycosides, such as cyanogenic glycosides, are also present in plants. Cyanogenic glycosides produce cyanide on hydrolysis (Kingsbury 1966). Familiar plants that produce cyanogenic glycosides are many members of the rose family, such as apple and peach trees, raspberry plants, and saskatoon bushes. Amygdalin is the common cyanogenic glycoside in the Rosaceae. The glycosides are harmless until hydrolysis releases the cyanide. Healthy plants typically contain little cyanide, but wilted leaves or sickly plants can be toxic (Kingsbury 1966:23-24). (This is the reason one can make raspberry leaf tea from either completely fresh or totally dried leaves, but not wilted specimens).

Phenolic compounds are also widespread in plants. These compounds make major contributions to the taste, flavour and colour of plant foods and beverages. The red colour of wine is imparted by anthocyanins, and the taste and astringency of tea is created by its high polyphenol content (Mann *et al.* 1991). Phenols have a single benzene ring with one or more attached hydroxyl groups. There are a number of different types of phenolic compounds, including simple phenols, phenolic acids, and diverse types of polyphenols. Arbutin is a common simple phenolic compound (Pratt and Youngkin 1951). Arbutin is found in *Arctostaphylos uva-ursi* and *Chimaphila umbellata* leaves, which are used medicinally as diuretics (Claus *et al.* 1970). Phenolic heterosides such as salicin and populin, are present in trees and shrubs of the willow family (Cronquist 1981:432). These are forms of phenolic acids.

Tannins are polyphenolics which have the effect of denaturing proteins; they have strong astringent and antiseptic action (Pratt and Youngkin 1951) and are economically important for their action in turning animal skins into leather. Tannins are common secondary metabolites in many plant orders (Cronquist 1981) including both dicots and monocots.[3] Frequently they are present in barks of temperate zone dicotyledonous trees and shrubs. Tannins have been used medicinally as burn treatments and as antidiarrhoeics because their astringent properties help to diminish loss of fluids from damaged tissues.

The two large groups of tannins are hydrolysable tannins, which have a sugar or cyclitol esterified with several molecules of gallic acid, or other polyphenolic acid derived from it, and condensed tannins, which are composed of flavan units such as (+)-catechin, (-)- epicathechin,or their analogues, condensed with each other via carbon-carbon bonds (Okuda *et al.* 1991.) Caffeetannins, labiataetannins, and phlorotannins are other types of tannins (Okuda *et al.* 1991). The latter occur generally in marine species and will not be significant in the following discussion. Proanthocyanins are tanniferous compounds, and also are the precursors of anthocyanin pigment molecules which give red or blue pigments in plants. Pyrogallol, gallic acid, catechol and ellagic acid are common constituents of tannins (Cronquist 1981; Chandler and Hooper 1982; Pratt and Youngkin 1951).

Tannins and other polyphenolics can interfere with absorption of nutrients when present in excessive amounts in foods (Griffiths 1989). At high concentrations, tannins usually inhibit enzyme activity, but at low concentrations they often stimulate enzyme activity (Okuda *et al.* 1991.) Tannins can also inhibit mutagenic activity of carcinogens, inhibit tumour promotion, or show host-mediated anti-tumour activity (Okuda *et al.* 1991.) Caffeic acid and rosmarinic acid, caffeetannins and labiaetaetannins, inhibit histamine release, which is important in inflammation reactions (Okuda *et al.* 1991).

Flavonoids such as quercetin are the largest group of polyphenolics found in plants; these are frequent constituents of higher plants. They have a basic heterocyclic structure, with one oxygen atom substituting for a carbon, and are similar in structure to anthocyanidins, which produce red or blue colouring (Pratt and Youngkin 1951). A number of flavonoids are biologically active, with antiinflammatory, antioxidant, antitussive, antiviral, hypotensive, diruetic, or anti-allergic properties. Some flavonoids are known to inhibit prostaglandin biosynthesis (Hiermann *et al.* 1986).[4]

Lignans are another important type of polyphenolic polymer. Lignans are abundant constituents of cell walls of xylem cells (tracheids, vessel elements, fibres, and other schlerenchyma cells) and are synthesized by all vascular plants (Greulach 1973); without lignans, plant tissues would lack the rigidity necessary for upright growth on land. Lignan molecules are composed of numerous benzene rings variously linked together and substituted; they can be considered polyflavones (Greulach 1973). Lignans are difficult to decompose; the plants which produce them lack enzymes to do this, and herbivores are also generally unable to break them down. Several species of bacteria and fungi are capable of decomposing lignans.

Coumarins, also polyphenols, are responsible for the sweet smell of vanilla and sweetgrass. Dicoumarols have a pronounced anti-coagulant effect, such as those produced in mouldy sweet clover (*Melilotus*). Such compounds can be used medicinally for treatment of blood clots (Pratt and Youngkin 1951), and as rodenticides (*Warfarin*™).

Mucilages are complex carbohydrates, or polysaccarides, which can absorb large quantities of water in colloidal gels (Schauenberg and Paris 1977). Pectins and soluble fibre are mucilages. These compounds have an emollient effect when taken as medicines; such medications as psyllium, a mucilage from a species of *Plantago*, are used as drugs to reduce diarrhea. Mucilage from slippery elm has a long history of use as a treatment for cough. Plants containing mucilages may also be used to treat wounds (Schauenberg and Paris 1977).

PHARMACOGNOSY OF MEDICINAL PLANTS

Pine

Very young inner bark of lodgepole pine, *Pinus contorta*, is eaten by the Gitksan. Older bark is used medicinally, as are young needles and particularly the pitch. The bark and young needles may be used in mixed decoctions for respiratory conditions or general sickness, or as tonics. The pitch is highly valued as a wound and burn dressing. Young needles are also sometimes pounded with pitch or grease for salve.

Airaksinen *et al.* (1986) report lignans and tannins in the inner cortex of scotch pine, *Pinus sylvestris*, along with resins, terpenes, waxes and steroids. *Pinus contorta* bark is reported to contain various flavonoids (myricetin, quercetin, dihydro quercetin) (Vercruysse *et al.* 1985). Needles also contain flavonoids, including quercetin, kaempferol, and iso-rhamnetin, as well as various lignans (Higuchi and Donelly 1977). Bark and oleoresins studied from cultivated lodgepole pine in New Zealand yielded various monoterpenes, including camphene, car-3-ene, limonene, myrcene, ß-phellandrene, α-pinene, ß-pinene, sabinene, and terpinolene (Manning and Hemmingson 1975).

The bark or shoots of various species of pine are known to have antibacterial properties (Moskalenko 1986; McCutcheon *et al.* 1992). Moskalenko found moderate to strong antibacterial activity of ethanol extracts of bark or leaf of *Pinus ajannensis*, *P. koraiensis*, and *P. pumila* against all of the bacterial forms assayed (*Staphylococcus aureus* strains 617 and 209, *Bacillus subtilis* 89, *Eschericia coli* 12835 and *E* "crim" 2584, *Mycobacterium smegmatis* 1b, and *Shigella sonnei* 3c and *Sh. flexneri* 2a), including both gram positive and gram negative forms. Methanol extracts of lodgepole pine bark from British Columbia were found to exhibit antibiotic activity against *Bacillus subtilis*, *Escherichia coli* DC2, *Mycobacterium phlei*, *Pseudomonas aeriginosa* H188 (an antibiotic supersusceptible strain), methicillin sensitive and resistant *Staphylococcus aureus*, and *Salmonella typhimurium* by McCutcheon *et al.* (1992). Pitch of lodgepole pine has also been reported to have antibacterial properties (Ritch-Krc *et al.* 1996b).

Antiviral properties are also likely in preparations from pine pitch, needles, or bark. α-pinene and limonene are both reported to be active against influenza A and B viruses in vitro (Che 1991.) Quercetin has shown in vitro activity against parainfuenza 3 virus, Aujeszky virus, pseudorabies virus, herpes simplex, herpes hominis and suis, and polio virus, and in vivo activity in mice against Mengo virus, encephalomyocarditis virus and several other strains (Che 1991).

Spruce Bark

Spruce bark and young spruce needles, or "tips" from hybrids of *Picea engelmannii*, *P. sitchensis* and *P. glauca* are widely used by the Gitksan in medicinal decoctions for respiratory ailments, tonics, and general sickness. Spruce tips or bark may also be pounded for external application in salves, and the pitch is also used. Spruce pitch may be used as chewing gum; young spruce inner bark (new active phloem) may be eaten as a food.

Picea engelmannii bark from Washington state was reported to contain benzenoids (astringin and iso-rhapontin) (Pearson *et al.* 1979). *Picea glauca* bark contains tannins (Arnason *et al.* 1981). *Picea mariana* bark contains minor amounts of steroids (campesterol, stigmasterol and ß-sitosterol), along with a relatively large amount of unidentified lipids with short retention time in chromatography (Hooper and Chandler 1984).

Essential oil from young European spruce shoots (*Picea abies*) was found in an Austrian study to have wide activity against a number of bacterial strains (laboratory strains of *Staphylococcus aureus* ATCC 6538, ATCC 2112, Oxford 1813, *Streptococcus faecalis* ATCC 6057, and *Bacillus subtilis* ATCC 1813; and strains isolated from patients of ß-haemolysing *Streptococcus* A, *S. pneumoniae*, *S. milleri*, *Staphylococcus* strains, and *Corynebacterium diphtheriae*) and against *Candida albicans* (yeast) (Kartnig *et al.*1991). It compared favourably with a commercial antibiotic, chloramphenicol. Pitch from *Picea glauca* was found by Ritch-Krc and her colleagues to have antibacterial properties (1996b).

Fir Bark

The bark of subalpine fir, *Abies lasiocarpa*,[5] and its liquid pitch from bark blisters are both highly prized medicinals for the Gitksan, who consider subalpine fir to be quite a strong medicine. It is frequently used in preparations for respiratory ailments, in tonics, orally as a "cleanser", and as dressing for sores or wounds.

Abies lasiocarpa (entire plant) is reported to contain a sesquiterpene called lasiocarpenone (Fraser and Swan 1975). Arnason *et al.* (1981) indicate that *Abies balsamea* from eastern Canada contains quercetin and tannins. Hooper and Chandler (1984) found minor amounts of campesterol and ß-sitosterol in balsam fir bark and similar amounts of campesterol, stigmasterol and ß-sitosterol in needles. The bark of *Abies balsamea* contained relatively high amounts of triterpenoids; α and ß-amyrin, allobetulin and betulin made minor contributions to the total triterpenoid content (Hooper and Chandler 1984). High levels of tannins and polyphenols of the progallol type were also detected in extracts of the bark (Chandler and Hooper 1982).

Methanol extracts of bark and leaf from Siberian *Abies* species tested by Moskalenko (1986) showed moderate to strong activity against all of the bacterial strains they tested (*Staphylococcus aureus* strains 617 and 209, *Bacillus subtilis* 89, *Eschericia coli* 12835 and *E* "crim" 2584, *Mycobacterium smegmatis* 1b, and *Shigella sonnei* 3c and *Sh. flexneri* 2a). However, Ritch-Krc *et al*, (1996) found only partial inhibition of *S. aureus* by a pure *Abies lasiocarpa* pitch extract, while *E. coli* and *Pseudomonas aeriginosa* remained unaffected, and no antifungal properties were observed. Antiviral activities of bark preparations are likely due to the presence of quercetin.

Juniper

Juniper boughs, sometimes with berries on them, are the portion of the plant used medicinally by the Gitksan. The juniper species used are the prostrate circumpolar species *Juniperus communis*, and the upright western North American *Juniperus scopulorum*. Usually this plant is used as an aqueous decoction, although sometimes it is burned as a fumigant.

Juniperus communis is well characterized biochemically. Juniper boughs and 'berries' contain a large number of compounds including flavonoids, benzenoids, lignans, alkenes, diterpene polyprenoids, malic acid, malonic acid, oxalic acid, phenyl pyruvic acid, aconitic acid, tartaric acid, vanillic acid and ascorbic acid which have been isolated by a number of different investigators (*e.g.* De Pascual *et al.* 1980; Lamer-Zarawaka 1977; Linder and Grill 1978). The AGIS phytochemical database (Beckstrom-Sternberg and Duke 1994) reports values of 600 ppm ascorbic acid in the leaves of *Juniperus communis*. Kuhnlein and Turner (1991) record that leaves of *Juniperus* sp. were also reported to contain 12.8 g protein, 167 mg of Vitamin C, 500 mg of calcium, 260 mg of phosphorus, 1150 mg of potassium and 180 mg of magnesium per 100 g of leaves. If a substantial portion of this is soluble in hot aqueous solution, a decoction of juniper leaves might also be a nutrient supplement. If the decoction were boiled for a prolonged period, losses of vitamin C would be expected. Hooper and Chandler (1984) have also isolated relatively high levels of ß-sitosterol in juniper branches, needles and green and ripe berries, along with minor amounts of campesterol and and stigmasterol in all parts except the green berries. Unidentified lipids were also a significant component. Juniper berries contain up to 2% volatile oil, up to 33% sugar, 9% resin, tannin, and a flavone glycoside according to Claus *et al.*(1970). Juniper oil, distilled by steam from the ripe fruit, contains about 50% alcohols (1-terpinen-4 ol., α-pinene, camphene and cadinene)(Claus *et al.* 1970). Although it is an irritant, the oil is used as a diuretic.

The 'berries' show antitumor and antiviral effects *in vivo* and *in vitro*, and have shown embryotoxic effects *in vivo* in rats (Agrawal *et al.* 1980; Belkin *et al.* 1952; Che 1991; May and Willuhn 1978 and others). Methanol extracts of British Columbia *Juniperus communis* branches with needles exhibited a broad spectrum of antibiotic activity, showing moderate inhibition against cultures of *Bacillus subtilis*, *Escherichia coli*, *Mycobacterium phlei*, *Pseudomonas aeriginosa* H188 (an antibiotic supersusceptible strain), methicillin sensitive and resistant *Staphylococcus aureus*, and *Salmonella typhimurium* (McCutcheon *et al.* 1992). The spectrum of strains against which it was active was identical to *Pinus contorta*, but the average level of activity was somewhat higher.

Devil's Club

Devil's club, *Oplopanax horridus*, is a sprawling shrub in the panax family, which also contains both wild sarsaparilla (*Aralia* spp.) and ginseng. It is a widely used and important medicinal plant for the Gitksan.

Japanese researchers working on *Oplopanax japonicus* isolated opladiol and oplanome; other compounds found were Et. palmitate, Et. linoleate, nerolidol, stigmasterol and ß-sitosterol (Feng n.d.). Analysis of *Oplopanax horridus* carried out at the University of Alberta in 1991-1992 also revealed opladiol in aqueous extract of the inner bark. This research isolated several other compounds in addition, identified by Feng as (-)-4 α, 7β–aromadendramediol; 3,10,11-trihydroxy-3,7,11-trimethyl 1,6-dodecadiene; ( )-adenosine; and adenine. The first three compounds are triterpenoids but the bioactivity of the isolated compounds has not been demonstrated because a satisfactory assay to demonstrate activity was not found (Feng n.d.).[6] Adenosine is a nucleotide important in cellular metabolism, forming ATP and ADP, essential in cellular energy reactions, and has been isolated from a number of plant sources. Adenosine is reported to have a number of physiological effects: it is antiaggregant, antiarhythmic, antiendotoxic, antiipolytic, antitachycardic, an arteriodilator, has insulinic effects, stimulates respiration, and is a vasodilator ((Beckstrom-Sternberg and Duke 1994). Its antiplatelet effects may be helpful in treating cardiovascular disease (Venton *et al.* 1991.) Adenine is a purine; it is one of the four bases which form nucleotides which comprise DNA and RNA and other metabolically essential compounds such as vitamins and coenzymes (Greulach 1973). As one might expect, adenine also has a number of physiological effects. It is reported to be antianemic, antigranulocytopenic, antiviral, to stimulate the central nervous system, to be diuretic, hypouricemic, lithogenic, myocardiotonic, to be a pesticide and viricide, and to be a vasidilator (Beckstrom-Sternberg and Duke 1994). Preliminary studies by Stuhr and Henry in 1944 found oleic and unsaturated fatty acids, saponins, glycerides and tannins in devil's club.

Some clinical studies from the 1930's suggest hypoglycaemic properties for devil's club extracts (Brocklesby and Large 1938, Justice 1966). Apparently two other studies failed to replicate the results (Smith 1983). In vitro inhibition of degradation of insulin by hot water extracts of devil's club was reported by Williams *et al.* (1959); however, no in vivo hypoglycemic activity in rats was shown by hot water extracts of devil's club at a dosage of 500 mg/kg.

Recent research carried out at the University of British Columbia by McCutcheon *et al.* (1992) demonstrates *in vitro* antibiotic activity of methanol extracts of devils club against *Mycobacterium phlei*, *Pseudomonas aeruginosa* H188 (an antibiotic supersusceptible strain), methicillin sensitive and resistant *Staphylococcus aureus*, and *Salmonella typhimurium*. Strong inhibition was observed against the *Mycobacterium* and the methicillin sensitive *Staphylococcus*. Partial inhibition of respiratory syncytial virus was also demonstrated by an inner bark extract of devils club (McCutcheon *et al.* 1995).

Indian Hellebore

Indian hellebore (*Veratrum viride*) is recognized by the Gitksan as potentially deadly. The plant contains a number of toxic alkaloids which can cause death through depression of central blood pressure (Edwards 1980; Jeger and Prelog 1960; Kingsbury 1964). The various alkaloids may exist in the plant as glycoalkaloids or ester alkaloids, with alkamines of steroidal configuration. Veratrosine is one the glycoalkaloids characterised from *Veratrum viride*; its alkamine form is veratramine (Kingsbury 1964). It has hypotensive effects. A number of active compounds are reported from the roots of *Veratrum viride*, most of which showed hypotensive activity.[7] Four compounds were reported to have pesticide, insecticide or fungicidal activity;[8] veratrine in addition has analgesic, counterirritant, emetic, mucoirritant, antiparasitic, pediculosidic, and ruminotoric properties (Beckstrom-Sternberg and Duke 1994). However, the compounds reported to occur in the rhizome, which is the portion used by the Gitksan, were of unknown activity with the exception of acetic acid (vinegar), which occurs in many plant species (Beckstrom-Sternberg and Duke 1994).[9]

Preparations of *Veratrum* were widely used as medicine or insecticides in the United States during the 18th and 19th centuries, but problems with variable potency and unpredictable toxicity led to their eventual disuse (Kingsbury 1964). Semisynthetic compounds based on *Veratrum* alkaloids may be used in modern medications for hypertension (Farnsworth and Bingel 1973); in 1973 1,072,000 prescriptions for *Veratrum* based medications were issued in the United States.

The properties of external washes or of the smoke of burning dried Indian hellebore rhizome remain unknown.

Cow Parsnip

Cow parsnip, *Heracleum lanatum*, is used medicinally by the Gitksan as well as eaten as a green vegetable. The rhizome is used medicinally to poultice arthritic swelling, as well as in smudge treatments for spiritual ailments.

Cow parsnip *Heracleum lanatum* contains abundant furanocoumarins (Berenbaum 1981; El-Dakhakhny and Steck 1970; Pathak *et al.* 1962) which damage DNA in the presence of ultraviolet radiation, causing blistering

(Camm *et al.*, 1976). Japanese workers have also isolated several lignans from the root of Japanese plants (Nakata *et al.* 1982). The roots of *Heracleum laciniatum* are reported to contain angelicin, bergaptin, isobergaptin, isopimpinellin, pimpinellin, and sphondin.

Antibiotic assays carried out in British Columbia by McCutcheon *et al.* (1992) revealed antibiotic activity in methanol extracts of aerial parts against *Mycobacterium phlei*, *Pseudomonas aeruginosa* 188(supersusceptible strain), both methicillin sensitive and methicillin resistant *Staphylococcus aureus*, and against *Salmonella typhimurium* TA98. The root extract showed weak activity against *Bacillus subtilis*, and the *Staphylococcus aureus* strains; stronger activity was noted against E-coli, *Mycobacterium*, and salmonella. Cow parsnip root extracts also showed antifungal activity against nine fungal strains (McCutcheon *et al.* 1994).

Yellow Pond Lily

The rhizome of yellow pond lily, *Nuphar polysepalum*, is used by the Gitksan for a variety of purposes, including orally as a tonic and appetite stimulant, and topically as a poultice for rheumatic swellings and to aid in healing of fractures. It was also used frequently in treatment of tuberculosis in the past, and was reportedly used as a male contraceptive.

Nuphar advena reportedly contains tannins; *Nymphaea odorata* is reported to contain gallic acid and ellagic acid (phenolics) (Arnason *et al.* 1981) and minor quantities of triterpenoids (Hooper and Chandler 1984). Gallic acid shows antiviral activity in vitro (Che 1991) and has anticarcinomic, antifibrinolytic, antioxidant, antiseptic, astringent, bacteristatic, hemostatic and styptic properties. It is also reported to be cancer-preventive, and carcinogenic, nephrotoxic, pesticide, and a xanthine-oxidase inhibitor (Beckstrom-Sternberg and Duke 1994.) Ellagic acid also has antiviral properties and is active against HIV. It inhibits several enzymes, is antioxidant, antitumor, astringent and hemostatic, and protective of the liver, but can be cytotoxic (Beckstrom-Sternberg and Duke 1994.) *N. odorata* roots [=rhizomes?] contain relatively high amounts of ß-sitosterol, with small amounts of campesterol and stigmasterol, and a relatively large proportion of unidentified lipids with short retention time in chromatography (Hooper and Chandler 1984). *Nuphar variegatum* , closely related to *Nuphar polysepalum*, was reported to contain alkaloids in preliminary work by Marles (1984). *Nuphar polysepalum* may contain β-sitosterol, a common plant steroid component. Several studies have linked β-sitosterol with infertility in male rats (Ghannudi *et al.* 1978; Malini 1987; Malini and Vanithkumari 1991), which might bear on its Gitksan use for male contraception. Effects on fertility of female rabbits have also been demonstrated (Burck *et al.* 1982).

Antibacterial assays of ethanol extracts of the root and rhizome of *Nuphar polysepalum* from British Columbia showed moderate to strong activity against *Bacillus subtilis*, *Escherichia coli*-DC2, *Mycobacterium phlei*, the supersusceptible strain of *Pseudomonas aeruginosa*, and both methicillin sensitive and resistant strains of *Staphylococcus aureus* (McCutcheon *et al.* 1992).

Elderberry

Red elderberry (*Sambucus racemosa*) bark and root bark are used by the Gitksan as an emetic. Red elderberry bark and roots are reported to contain choline (Yardin 1936) and the triterpenoid ursolic acid (Borokov and Belova 1967). In the tests conducted by McCutcheon *et al.* (1992), red elderberry showed weak antibiotic activity against methicillin resistant *Staphylococcus aureus*. Assays of an ethanol extract of *Sambucus coreana* leaves from Siberia revealed no antibiotic activity (Moskalenko 1986). Branch tips of *Sambucus racemosa* were found to show strong inhibition of respiratory syncytial virus by McCutcheon and her colleagues (1994).

The plant contains substances which are purgative in moderate amounts (Kingsbury 1964). Ursolic acid is reported to be antidiabetic and hypoglycemic, antiinflammatory, antileukemic, diuretic, hepatoprotective, to have antitumor properties and be a cancer preventative, to be a central nervous system depressant, to be cytotoxic, and a piscicide (Beckstrom-Sternberg and Duke 1994).

Black Twinberry

Black twinberry, *Lonicera involucrata*, berries and bark were used by the Gitksan for eye medication.

Bisset (1991) mentions that monodesmoside saponins are found in the genus *Lonicera*. Whether *L. involucrata* contains such compounds, or in what part of the plant they might be present, is unknown. Bisset (1991) states that monodesmoside saponins show mollusicidal properties. A methanol extract of branches of *Lonicera involucrata* demonstrated no antibacterial activity in any of the assays conducted by McCutcheon *et al.* (1992). Other species of *Lonicera* from Siberia assayed by Moskalenko (1986) did show significant antibiotic activity (*L. mackii* and *L. maximowiczii*), though the fruits and leaves were much more active than the bark. The bark of *L. maximowiczii* did not show any activity.

Red Osier

Red osier dogwood, *Cornus stolonifera*, is used medicinally by the Gitksan as an aid in healing fractures or as a poultice for sores. It is used more extensively by the neighbouring Wet'suwet'en, where it is employed in mixed medicinal decoctions, and for stomach pain and post-partum hemorrhage.

Cornus stolonifera stem bark contains alkanes (C24:C26), fumaric acid, and the flavonoid hyperoside (hyperin) (Nair and Von Rudolff 1960). Fumaric acid is reported to have antitumor and antioxidant properties, and protect against liver cancer (Beckstrom-Sternberg and Duke 1994). Hyperin is reported by Beckstrom- Sternberg and Duke (1994) to be antiinflammatory, antioxidant, antitussive, antiviral, diuretic, hepatoprotective, hypotensive, viricidal, and pesticidal, and to fortify capillaries and induce capillary formation. *Cornus florida* contains ursolic acid; the properties of ursolic acid were given under *Sambucus racemosa*.

An extract of red-osier branches tested by McCutcheon *et al.* (1992) showed little antibacterial activity; low levels of inhibition of *Mycobacterium phlei* was the only antibiotic activity found.

Alder

The alder usually used medicinally by the Gitksan is *Alnus crispa* ssp. *sinuata*. Some use was also made of red alder, *Alnus rubra*, and possibly of *Alnus incana* ssp. *tenuifolia* as well. Medicinal preparations are made from the stem bark, buds, and immature female catkins. Male catkins are reported to have been used in the early part of the century (Smith n.d.).

Alnus crispa bark is reported to contain various triterpenes (α-and ß-amyrin, betulin, and lupeol) and minor amounts of sterols (Hooper and

Chandler 1984) and the buds contain several flavonoids (ayanin, 3'-4'-5-trihydroxy-3-7-dimethoxy flavone, and 4'-5-dihydroxy-3-7-dimethoxy flavone) (Wollenweber 1975). *Alnus sinuata* (=*A. crispa* ssp.*sinuata*) buds are reported to contain three flavonoids (3'-4'-5-trihydroxy-3-7-dimethoxy flavone, 4'-5-dihydroxy-3-7-dimethoxy flavone, and genkwanin) (Wollenweber 1975). Genkwanin is reported to have bactericidal, pesticidal and purgative properties (Beckstrom-Sternberg and Duke 1994). *Alnus viridis* buds, considered by some to be the same species as *A. crispa*, are reported to contain the flavonoid quercetin (Wollenweber 1975) and the benzenoid 4'-5'-didroxy-3'-methoxy stilbene (Favre-Bonvin *et al.* 1978). Quercetin has widespread biological activities, including antiallergic, antidiabetic, antiestrogenic antihistaminic, antiinflammatory, cytotoxic, antibacterial, antiviral, spasmolytic, teratogenic, vasodilator, and various inhibitory effects against cellular enzymes.[10]

Alnus incana buds contain also contain various flavonoids (betuletol, 5-7-dihydroxy-4'-6-dimethoxy flavone, mikanin, quercetin, iso-rhamnetin, and 4'-6-7-trimethyl-pectolinarigenin scutellarein) (Wollenweber 1975). Iso-rhamnetin shows antihistaminic, antiinflammatory, antioxidant, bactericidal, cancerpreventative, hepatoprotective and spasmolytic properties, and is reported to be a pesticide (Beckstrom-Sternberg and Duke 1994).

Alnus oregana (=*rubra*) stem bark is reported to contain the triterpenes betulin and lupeol, and ß-sitosterol (Sheth *et al.* 1973). According to Beckstrom-Sternberg and Duke (1994) betulin has antitumor, cytotoxic and hypolipemic porperties. *Alnus rubra* stem bark was also reported to contain a benzenoid, oregonin (Hrutford and Luthi 1981). *Alnus rubra* buds are reported to contain a number of flavonoids (acacetin, apigenin, betuletol, 5-7-dihydroxy-4'-6-dimethoxy flavone, kaempferide, and iso-rhamnetin) (Wollenweber 1975). Acacetin is reported to have antiallergic properties, while apigenin has a number of diverse activities, including antiallergic, antiarhythmic, antiestrogenic, antihistaminic, antiinflammatory, antimutagenic antioxidant, bactericidal, cancer-preventative, cholerectic, duretic, hypotensive, muscle-relaxant, sedative, spasmolytic properties, and is a vasolilator and pesticide. Che (1991) also lists it as active in vitro against Aujeszky virus and herpes simplex.

Extracts of *Alnus glutinosa* from the United States from the fresh flowers, water or ethanol extracts of fresh fruits, or extracts of twigs with buds and leaves are reported to show in vitro activity against *Mycobacterium tuberculosis* (Frisbey *et al.* 1953). Dried fruits of the same species from Romania were reported to show anti-trichomonal activity (Racz *et al.* 1980). Both male and female catkins were reported to have estrogenic effect in mice (Walker and Janney 1930). Stem bark extracts of an Indian species of alder, *A. nitida*, were reported to have an antiviral effect in vitro (Omar *et al.* 1973). Water or ethanol extracts of stem bark of a second Indian species, *A. nepalensis*, were reported to have hypoglycemic and antispasmodic activity (Omar *et al.* 1968). Several American species of alder are reported to have a tumor promoting effect (*A. arguta, A. firmifolia*, and *A. oblongifolia*) (Caldwell and Brewer 1983); however, a CHCl3 extract of *Alnus oregana* (=*A. rubra*) is reported to have antitumour activity in the rat (Sheth *et al.* 1973).

Alnus rubra bark and catkins showed moderate to strong antibacterial activity against all species assayed by McCutcheon *et al.* (1992), with strongest activity against *Mycobacterium phlei*. An extract of *Alnus rubra* catkins showed strong activity against all nine fungal species assayed (McCutcheon *et al.* 1994). Methanolic extracts of *Alnus incana* were found by Ritch-Krc and her colleagues (1996b) to be cytotoxic to mouse mastocytoma cells.

Cherry

Prunus pensylvanica bark is used medicinally by the Gitksan, particularly in mixed decoctions used for treatment of cough.

Prunus pensylvanica analysed from eastern Canada contained moderate levels ß-sitosterol in both bark and leaves (Hooper and Chandler 1984), and high levels of catechol type tannins and polyphenols in the bark (Chandler and Hooper 1982). The bark of an eastern North American wild cherry, *Prunus serotina*, has been used medicinally and gathered commercially. According to Claus *et al.* (1970:117), the wild cherry bark contains a cyanogenic glycoside, prunasin. It also contains the hydrolitic enzymic prunace, *p*-coumaric acid, trimethyl gallic acid, starch, traces of a volatile oil, and a resin which yields scopoletin on hydrolysis. P-coumaric acid is reported to show antineoplastic, bactericidal, cholorectic, and pesticidal properties, and to inhibit lipoxygenase activity and prostaglandin synthesis (Beckstrom-Sternberg and Duke 1994). Medicinal use of wild cherry syrup made from this species is as a sedative expectorant. According to Claus *et al.* (1970), the scopoletin has antispasmodic properties.

Viburnum or Highbush Cranberry

Highbush cranberry (*Viburnum edule*) twigs or bark form part of mixed medicinal decoctions used as tonics and general medication for sickness.

While constituents of *Viburnum edule*, the species used by the Gitksan, were not available, the related species *Viburnum prunifolium* and *V. opulus* of eastern North America have been the source of commercially collected phytopharmaceuticals and their constituents have been characterized. *V. prunifolium* contains amentoflavone, scopoletin, ß-sitosterol, aesculentin, α-and ß-amyrin, oleanic acid, ursolic acid, and arbutin. The dried root or stem bark preparation is antispasmodic, which is attributed to the scopoletin and other coumarins, and it is used as a uterine sedative (Claus *et al.* 1970:127). *Viburnum opulus*, also known as cramp bark, contains the same constituents as *V. prunifolium* except that amentoflavone is absent, while *dl*-catechin is present (Claus *et al.* 1970). Preparations of the bark of *V. opulus* have similar physiological properties to preparations of *V. prunifolium* and are used similarly. *Viburnum cassinoides* bark from eastern Canada contained from ß-sitosterol, along with minor campesterol and stigmasterol, and a relatively large amount of unidentified lipids with short retention times in chromatography (Hooper and Chandler 1984) and minor amounts of α-amyrin and unknown triterpenoids (Hooper and Chandler 1984). Preliminary screening of *Viburnum cassinoides* also indicated presence of alkaloids and high levels of catechol type tannins and polyphenols (Chandler and Hooper 1982).

Two Siberian species of *Viburnum* were assayed by Moskalenko (1986). *Viburnum burejasticum* bark showed weak to moderate activity against *Mycobacterium smegmaticus, Escherichia coli, E.* "crim" 2584, *Shigella sonnei,* and *S. flexneri.* The leaves of a second species, *V. sargentii*, showed strong activity against *Staphyloccocus aureus* strains 617 and 209, and *E.* "crim" 2584, and moderate activity against the remaining bacterial strains assayed.

Wild Crabapple

The bark of wild crabapple, *Malus fusca*, was used for eye medicine. A decoction of the bark of twigs could be used for rheumatism or cough. Apparently it was also used in tonic medications.

No information on the constituents of the bark of *Malus* species was located. It may be similar to cherry, mountain ash, and hawthorn barks, small trees in the Rose family closely related to apple. An assay of *Malus mandshurica* leaves for antibiotic activity by Moskalenko (1986) showed weak to moderate activity against all of the species surveyed. Apparently the bark was not assayed.

Mountain Ash

Twigs of mountain ash *Sorbus scopulina* and *sitchensis* were boiled in mixed decoctions as tonics or for treatment of respiratory illness.

Hooper and Chandler (1984) isolated moderately high levels of triterpenoids in stem bark and twigs and leaves of *Sorbus americana* from eastern Canada; α-amyrin, betulin and other triterpenoids were present. The bark contained relatively more total and unknown triterpenoids, while the leaves contained slightly more α-amyrin. Low levels of ß-sitosterol were also found in the bark; campesterol and ß -sitosterol were detected in the leaves (Hooper and Chandler 1984). Preliminary screening indicated that the bark contains high levels of catechol type tannins or polyphenols (Chandler and Hooper 1982). Flavonoids were indicated by a positive cyanidin test (Chandler and Hooper 1982). Grieve (1931) states that the bark of the European species *Sorbus acuparia* is astringent and contains amygdalin. *Sorbus acuparia* bark also contains tannins (Beckstrom-Sternberg and Duke 1994).

The fruits of a Siberian species *Sorbus sambucifolia* showed strong antibacterial activity against all species tested (Moskalenko 1986). However, the leaves were largely inactive, showing weak to moderate activity against *Mycobacterium smegmaticus* and two species of *Shigella*. Bark was apparently not tested.

Soapberry

Soapberry (*Shepherdia canadensis*) fruits and twigs are both used medicinally by the Gitksan. The neighbouring Wet'suwet'en also use the leaves medicinally. The fruits are still a highly prized food, though not eaten in large quantities at one time.

Soapberries contain relatively large quantities of saponins (Turner 1981), which are responsible for their foaming properties in the preparation of Indian Ice Cream. The nutritional qualities of the fruits will be discussed in the section on plants used for food and beverages. No information is available on other potentially active components of the fruits, or of the twigs and leaves (Turner 1981), which are heavily dotted with orange glands. According to Cronquist (1981:606), the family Eleagnaceae is strongly tanniferous, with ellagic acid and often proanthocyanins, commonly producing quebrachitol, and sometimes, as with the soapberry, saponins. Some members also produce indole alkaloids. A methanolic extract of *Shepherdia canadensis* was cytotoxic to mouse mastocytoma cells (Ritch-Krc 1996b).

Aspen

Aspen (*Populus tremuloides*) bark was used as part of a cleansing purgative decoction by the Gitksan. In the past macerated aspen root bark was apparently used as a medication for cuts (Smith n.d.). The young 'cambium' was apparently also eaten (Smith n.d.).

Arnason *et al.* (1981) indicate that *Populus tremuloides* contains salicin, and *o*-pyrocatechol. Salicin has analgesic properties, and is a precursor of the ubiquitous ASA (acetyl salicylic acid), or aspirin™. It is also reported to have antiviral properties in vitro against polio virus (Che 1991.) The bark of balsam poplar contains a related compound, salicortin, which is analgesic (Beckstrom-Sternberg and Duke 1994).

A decoction of leaves or bark of *Populus maximoviczii* is apparently used to treat wounds in Siberia; these preparations showed moderate to strong antibacterial activity against all of the species assayed by Moskalenko (1986). However, McCutcheon *et al.* (1992) failed to find strong antibacterial activity in methanol extracts of *Populus tremuloides* bark from British Columbia; weak activity against *Mycobacterium phlei* and E-coli was found.

Yarrow

Yarrow (*Achillea millaefolium* in the broad sense) was used as a hair dressing when mixed with fat. Decoctions could be used as a heart tonic, for sore throat, or as a wound dressing.

Yarrow contains cineol, chamazulene, and proazulene, which are components of the essential oil of the yarrow plant. It also contains the bitter principal achilleine. According to Schauenberg and Paris (1977), cineol is antiseptic, expectorant, and stomachic, while proazulene is spasmolytic, astringent, and bitter. Tyler *et al.* (1981) state that chamazulene is also found in chamomile, and comment that yarrow tea can be used for the same purposes as chamomile. Chamazulene is reported to be anodyne, antiinflammatory, antioxidant, antiseptic, pesticide, spasmolytic, and vulnerary, and it is present in the yarrow plant at concentrations of 50-2800 ppm. (Beckstrom-Sternberg and Duke 1994). Arnason *et al.* (1981) list isovaleric acid, camphor, azulenes, and dehydromatricaria ester as constituents of yarrow. Azulene is said to be antiallergic and antiinflammatory, and to be a febrifuge and have antiulcer properties (Beckstrom-Sternberg and Duke 1994). Concentrations of azulene in the leaves of yarrow apparently vary from 0 to 7,140 ppm (Beckstrom-Sternberg and Duke 1994). Hooper and Chandler (1984) report that yarrow contains small amounts of ß-amyrin, α-amyrin, pseudotaraxasterol, taraxasterol, and other triterpenes; moderate amounts of the steroid ß-sitosterol, with smaller amounts of campesterol and stigmasterol are also present. Hamon and Hindmarsh (1978) found low levels of alkaloids in yarrow from Saskatchewan. Alkaloids were also detected in young shoots from eastern Canada by Chandler and Hooper (1979). Beckstrom-Sternberg and Duke (1994) list chemicals isolated from yarrow, including the compounds listed above, and a number of other active compounds, including 1,8 cineole, apigenin (discussed under *Alnus*), alpha and beta pinene, betaine, borneol, butyric acid, caffeic acid, camphene, camphor, choline, furfural, inositol, isorhamnetin, limonene, luteolin, myrcene, myristic acid, oleic acid, P-cymene, ponticaepoxide, quercetin, quercitrin, rutin, tannins, thiophenes, and thujone; and vitamins including beta-carotene, folacin and other B vitamins, and ascorbic acid. These compounds have a number of different activities which may be therapeutic, as well as some which may be toxic, and some which act as pesticides or herbicides. A complete discussion of the properties of the various compounds isolated from yarrow is far beyond the scope of this chapter, but potentially important properties are listed below. Therapeutic properties include antiseptic, antibacterial, antiviral and antifungal properties; hypotensive and antithrombotic and cardiotonic properties, and properties which strengthen capillaries, antihemorrhagic and anticataract properties; anticancer and antitumor properties; antihistaminic, antiinflammatory, antirheumatologic, antiasthmatic, and antiallergic properties; expectorant, and counterirritant properties; analgesic and antinephritic properties; hepatotonic effects, antidiabetic, and anticolitic and spasmolytic properties (Beckstrom Sternberg and Duke 1994; Che 1991). Potentially negative or toxic effects include abortifacient, anemiagenic, spasmogenic, paralytic, tumorigenic, phototoxic, cerebrodepressant, convulsant, epileptigenic, hallucinogenic, and respirainhibitory properties of some of the compounds, particularly thujone, which produces the negative central nervous system properties.

Yarrow also contains salicylates, although the concentration was not stated (Beckstrom-Sternberg and Duke, 1994). Salicylates act to block synthesis of prostaglandins, which causes decrease in peripheral pain sensation and also lowers body temperature, acting as a febrifuge.

An ethanol extract of *Achillea millaefolium* tested by Moskalenko (1986) showed moderate levels of activity against all of the species they assayed, with weakest activity against *Staphylococcus aureus*. Methanol extracts of *Achillea millaefolium* assayed by McCutcheon *et al.* (1992) showed moderate activity against E-coli, *Mycobacterium phlei*, and methicillin resistant *Staphylococcus aureus*, with weak activity against susceptible *S. aureus* and *Salmonella typhimurium*.

Horsetails and Scouring Rushes

Equisetum spp. are used by the Gitksan to treat bladder problems.

According to Schauenberg and Paris (1977:114), *Equisetum arvense* contains the glycosides isoquercetrin, luteolin and kaempferol, and the saponoside equisetonin, along with a trace of nicotine. It also contains relatively large amounts of silica. It is listed by them as diuretic, hemostatic, vulnary, and as a source of minerals. Luteolin has shown in vitro activity against a number of different viruses, including herpes simplex and several other types of herpes virus, polio virus, and pseudorabies virus (Che 1991.) Beckstrom-Sternberg and Duke (1994) list a number of other constituents which have reported biological activity as well: ß--sitosterol, caffeic acid, dihydroquercitin, ferulic acid, naringenin, oxalic acid, and p-hydroxybenzoic acid; and ascorbic acid, beta-carotene, niacin, and thiamine. *Equisetum arvense* also contains the enzyme thiaminase which breaks down thiamine, perhaps responsible for the poisoning of horses by horsetail in hay. Kaempferol, naringenin, oxalic acid and p-hydroxybenzoic acid have diuretic, bactericidal, fungicidal, antiinflammatory and antihistaminic properties, among others. Nicotine has strong effects on the autonomic nervous system, as well as being toxic to arthropod pests and ectoparasites, although the concentrations in horsetail are much less than in tobacco. Ferulic acid, also present in *E. hiemale*, has a number of activities, including antiviral, bactericidal, fungicidal, anti-cancer and spasmolytic properties. Caffeic acid has similar properties, and is a histamine inhibitor (Beckstrom-Sternberg and Duke 1994). Beckstrom-Sternberg and Duke (1994) tabulate chemicals present in *Equisetum hiemale*.: caffeic acid and ferulic acid are listed constituents with documented biological activity. In addition, calcium, potassium, and manganese are abundant mineral constituents, together with silicon dioxide.

Extracts of *Equisetum arvense* and *E. hyemale* assayed for antibiotic by McCutcheon *et al.* (1992) showed no inhibition against any of the species of bacteria tested. The same result was reported by Moskalenko (1986) for Siberian material. Belkin *et al.* reported in 1952 that extracts[11] of both species showed the capacity to damage sarcoma tissue implanted in mice, although they did not show pronounced activity.

Wild Calla or Water Arum

Some Gitksan use wild calla (*Calla palustris*) in mixed medicinal decoction for a tonic medicine. It is recognized by the Gitksan as being harmful to swallow before it has boiled for five or six hours (Gottesfeld and Anderson 1988). Kingsbury (1964) states that it contains abundant calcium oxylate, and will cause severe swelling of the oral cavity and pharynx upon ingestion of raw plants. Hultén (1968:281) states that the entire plant, especially the berries, contain "poisonous acids and burning saponin-like substances–all of which, however, are neutralized by drying or boiling."

Aralia or Actaea

The Gitksan used the root or rhizome of a plant "bear's berry" (***sgan maa'ytwhl smex***) as a medicine. It is uncertain if the plant referred to is a form of *Aralia nudicaulis* or possibly *Actaea rubra*.

Aralia nudicaulis "roots" [rhizomes?] from eastern Canada contained moderately high levels of ß -sitosterol, fairly high levels of unidentified lipids with short retention time in chromatography, minor campesterol and moderate levels of stigmasterol (Hooper and Chandler 1984). *Aralia nudicaulis* stems, leaves and rhizomes also contain moderate levels of triterpenoids, including α-and ß- amyrin, and a larger amount of other unidentified triterpenoids. Ginseng, well known for its triterpenoid ginsenosides, is also in the Aralia family. Marles reports preliminary results suggestive that *Aralia nudicaulis* rhizomes contain alkaloids (1984).

Actaea rubra is another possible identification for the therapeutic type of "bear berry"; it is a moderately poisonous herb with attractive bright red fruits in the Ranunculaceae or buttercup family, a family known for various irritating and poisonous members (Kingsbury 1964), as well as some sources of traditional plant medicines such as several species of the genus *Aconitum* or monkshood (Bisset 1991)[12] . According to Hultén (1968:456), both the berries and root contain protoanemonin, which causes vomiting, bloody diarrhea, and finally respiratory. The phytochemical database (Beckstrom-Sternberg and Duke 1994) lists a number of properties for protoanemonin; it is antibiotic, antileukemic, antimutagenic, antiseptic, antitumor, antiviral, bactericidal, and is active against *Candida*. It is a fungicide, an irritant which damages the kidneys, and a purgative, as well as a vermifuge and pesticide. Kingsbury (1966) states that fatal poisoning of either humans or livestock from baneberry has not been recorded in the United States. Apparently North American plants are less toxic than the European *A. spicata*. Grieve (1931) records that baneberry (the European species *Actaea spicata*) is antispasmodic; Schauenberg and Paris (1977) state that a tincture is used in homeopathy for articular rheumatism of the hands and feet and for "particular female ailments".

Heart Leaved Arnica

Leaves of heart-leaved arnica were apparently used as a topical treatment for sores.

No information exists in the literature on the constituents of *Arnica cordifolia* in particular, but some clinical and pharmacological data is available for other arnica species. *Arnica montana*, a European species, is reported to contain an essential oil composed of 2 triterpenic alcohols, arnidiol and faradiol; it also contains the flavonoids heterosides kempferol and quercetol (Schauenberg and Paris, 1977). Arnica stimulates circulation, is hypertensive, uterotonic, and "antiphlogistic" causing resorption of internal bleeding in cellulitis and apoplexy. Dilute arnica tinctures are used in homeopathy. The Mexican species called "Arnica", *Heterotheoa inuloides* is used for treatment of skin conditions and bruising (Linares 1994).

Large-leaved Avens

The leaves of large leaved avens, *Geum macrophyllum*, were used by the Gitksan and Wet'suwet'en topically as a treatment for sores.

The two European species *G. rivale* and *G. urbanum* are described as having astringent properties. They contain tannins, a bitter compound, and an oil which yields eugenol on hydrolysis (Schauenberg and Paris 1977). McCutcheon *et al.* (1994) found strong antifungal activity in *Geum macrophyllum* roots.

Indian Paintbrush

Decoctions of Indian paintbrush *Castilleja miniata* were reportedly used by the Gitksan for bleeding nose, bleeding, lung problems, bad eyes, "lame back" and for cough (Smith n.d.181).

Extracts of *Castilleja miniata* from Saskatchewan tested positive for the presence of alkaloids in a screening study carried out by Hamon *et al.* (1981).

Angelica

A decoction of the roots of *Angelica genuflexa* together with highbush cranberry twigs (*Viburnum edule*) is reported by Smith (n.d.) to have been used for a headache remedy and eye medicine.

European species of *Angelica* have been used in herbology. *Angelica archangelica* is reported to contain an essential oil; the roots contain 1% of this essential oil which consists of phellandrene, organic acids and the coumarin, angelicin (Schauenberg and Paris 1977). It is reported to be "tonic, carminative, stomachic, and anti-spasmodic" (Schauenberg and Paris 1977:217). Angelicin is also photoactive, and has shown in vitro activity against influenza virus type A (Che 1991). No information on the constituents of *Angelica genuflexa* was found.

Fern rhizome

Fern rhizome "demkt" is reported as the constituent of a mixed poultice for external application by Smith (n.d.:52). The identity of the fern rhizome ***damtx*** used for medicinal purposes is not entirely clear; the term refers to several types of inedible fern rhizomes (see Ch. 5 for discussion of classification), including rhizomes of lady fern *Athyrium filix -foemina*, *Dryopteris felix-mas*, and small rhizomes of *Dryopteris expansa*. The phytochemicals and physical properties of rhizomes from *Athyrium* would differ from those of the two *Dryopteris* species. *Athyrium* has medicinal uses among the Wet'suwet'en.

D. felix-mas rhizome has been used in European herbology as an anti-helminthic and contains aspidinol, albaspidine, phloraspine and filicinic acid (Schauenberg and Paris 1977). It acts on tapeworms by paralysing them, but not killing them. It is toxic, and Schauenberg and Paris (1977) state that the drug must be evacuated from the body within two hours of taking it. Extracts of the rhizome of the male fern *D. felix-mas* also show in vitro activity against vesicular stomatitis virus, herpes simplex and herpes simplex type 1 viruses, and influenza virus type A (Che 1991).

Anemone

Anemone, *Anemone multifida*, was reportedly eaten in the sweat bath, or taken as a decoction, as a treatment for rheumatism (Smith n.d.:106). It was stated to produce a burning sensation in the mouth, like whisky.

Anemone is in the buttercup family, and like other members of this family, contains anemonine and protoanemonine. The properties of these compounds are discussed in Kingsbury (1964:141). Protoanemonin is the irritating compound; ingestion of large amounts can cause severe gastrointestinal irritation and bleeding, as discussed previously under baneberry (*Actaea rubra*).

False Solomon's Seal

False solomon's seal root was apparently used medicinally in the past by Gitksan people as a wound dressing, treatment for rheumatism, and as a purgative treatment for sore back, kidney ailments, and rheumatism (Compton *et al*. n.d., Smith n.d.). Although widely used for medicine by Native peoples of North America, no pharmacological or biochemical information on *Smilacina racemosa* was located.

Cinder Conk

Cinder conk, *Inonotus obliquus*, is primarily used for moxabustion treatment of swelling and arthritis. In this treatment it is burned on the skin, and the burned area is then treated with a medicinal salve or with pitch.

In a study of the antibacterial effects of traditional medicines in eastern Siberia, Moskalenko (1986). 1 reported detectable *in vitro* antibacterial effects of an ethanol extract of the powdered fungus against *Bacillus subtilis* 89, *Mycobacterium smegmatis* 1b, *Eschericia coli* 12835, *E* "crim" and *Shigella sonnei* 3c.

No clinical studies of moxabustion treatment with *Inonotus* have been carried out.

Lobaria pulmonaria "frog blankets"

Lobaria pulmonaria and possibly *L. linita*, called ***gwilahl ganaa'w*** by the Gitksan, is reported as an arthritis medicine, as a tonic, and as a spiritually based health promoting treatment. In all these instances, it is used as an aqueous infusion, either applied as a bath or taken as a tea.

Lungwort was formerly used as a medication for lung ailments in Europe because of the resemblance of the texture of the thallus to the gross aspect of lung tissue. Culpepper's Complete Herbal, originally written in the 17th century, states "It is of great use in diseases of the lungs, and for coughs, wheezings, and shortness of breath, which it cures" (:220). He goes on to suggest its topical use for skin ulcerations. "It is drying and binding, good to stop inward bleeding, and the too great flux of the menses. It is good for consumptions and disorders of the breast...It is commended as a remedy against yellow-jaundice" (:220).

I have not been able to locate information on pharmacognosy of *Lobaria*; however, other lichens do have potential therapeutic effects. Moskalenko (1986) list moderately strong antibiotic activity of the fruticose arboreal lichen *Usnea dasypoga* against all of the species assayed.

PHARMACOLOGY AND NUTRITIONAL VALUE OF FOOD AND BEVERAGE PLANTS

Fireweed

Whole plant extracts of *Epilobium angustifolium* from Maritime Canada yielded a positive test for triterpenes (Chandler and Hooper 1979). Tannins and polyphenols of the progallol type were also present. The extracts tested were from mature fruiting plants collected in the fall, not the edible stage of *Epilobium angustifolium*. Russian investigators have isolated a polyphenol which they class as a novel lectin with hemagglutinating properties from mature flowers of *Epilobium angustifolium*. They have called this compound chanerol (Pukhalskaya et al. 1975). It is apparently an ellagotannin. Several flavonoids and sitosterol derivatives are also found in *Epilobium* spp. (Hiermann *et al.* 1986).

Aqueous *Epilobium angustifolium* extracts (plant part and maturity not stated) strongly lowered prostaglandin release in rabbits and rats *in vivo*, and greatly reduced the edema induced by injection of carrageenan in rat's paws, showing strong antiinflammatory effects (Hiermann *et al.* 1986). Chanerol, described above, apparently has tumor inhibiting effects in mice, but also agglutinates the red blood cells of various mammals, including mice, rabbits and humans (Pukhalskaya *et al.* 1975).

Nutritionally, fireweed is a good source of magnesium, and also provides modest amounts of calcium, phosphorous and vitamin A (Johnson Gottesfeld 1995).

Nodding Onion

Nodding onion, *Allium cernuum*, was eaten in the spring by the Gitksan. Although nutrient analyses of nodding onion are not available, it is probably similar to chives, *Allium schoenprasum*. Chives contain protein, thiamin, and vitamin C (Kuhnlein and Turner 1991). In addition, chives, like other species of *Allium*, contain sulphur-containing heterosides responsible for the strong taste and smell (Schauenberg and Paris 1977). Although chives are not used medicinally, these sulphur containing compounds probably have antibiotic properties like those of garlic and garden onions. Likely the nodding onion too contains sulphur-containing heterosides with antibiotic properties.

Stonecrop

No nutrient or phytochemical information is available for *Sedum* species. Two species are known to be edible: *Sedum divergens*, the species eaten in northwestern British Columbia, and *Sedum rosea*, the species eaten in the Circumpolar North (Hultén 1968; Kuhnlein and Turner 1991). Other species are described as inedible, acrid and irritating. *Sedum acre*, from Europe, is very acrid and can cause blisters, but may be used to treat hypertension. It is reported to contain an alkaloid, semadine, the glycoside rutin, tannin, and organic acids (Schauenberg and Paris 1977). Rutin has been reported to show activity in vitro against several strains of herpes virus (Che 1991).

Cow-parsnip Stalks

The young flowering stalks are eaten as a spring green by the Gitksan, along with many other Native peoples of western North America. The stalks are gathered when young and peeled, which serves to reduce the furanocoumarin content and avoid unpleasant side effects like blistering of the lips (Kuhnlein and Turner 1991). Cow parsnip stalks contribute 7% of the recommended daily nutrient intake for folate, which is required during pregnancy to prevent neural tube defects in the fetus, and also provides minerals and riboflavin. (See previous section for discussion of medicinal components of cow parsnip).

Root foods: edible fern rhizome, riceroot lily and lupine root

Large rhizomes of *Dryopteris expansa*, spiny wood fern, were pit cooked and eaten during the winter season. They could be gathered in relatively large amounts and stored, or used as famine food by being dug from under the snow. Fern rhizomes are relatively rich sources of fibre, and fairly nutrient dense, providing 126 kilocalories per 100 gram edible portion, and are one of the richest sources of carbohydrate in the traditional diet (Turner *et al.* 1992). Carbohydrate is required for efficient utilization of protein under conditions of marginal energy intake (Speth and Spielmann 1983). They also provide significant calcium, phosphorous and magnesium.

Although *Dryopteris expansa* is related to *Dryopteris felix-mas*, the male fern, which contains filic acid and other medicinally active and toxic constituents (see previous section), *D. expansa* does not seem to have toxic components, and was eaten by many Native peoples throughout its range in northwestern North America (Turner *et al.* 1991).

Riceroot bulbs were eaten seasonally by the Gitksan. They are a good source of carbohydrate and food energy. Riceroot bulbs are one of the few traditional foods reported to contain relatively abundant folate (Kuhnlein 1990). They also provide vitamin C and are a source of thiamin, magnesium and iron (Johnson Gottesfeld 1995). Although no chemical assays of *Fritillaria camschatcensis* were found, *F. thunbergii* bulbs contain various active phytochemicals such as ß-sitosterol, campesterol, fritillarine (anesthetic and hypotensive) and fritillarine (a muscle-relaxant) in addition to nutrients (Beckstrom-Sternnberg and Duke 1994).

Lupine roots apparently were consumed in the past. These are the taproots of either *Lupinus nootkatensis* or a hybrid of *L. nootkatensis* and *L. polyphyllus*. They may have had a medicinal function more than as a food, and were probably not consumed in large amounts. Lupines are generally considered to be poisonous, although there are records of consumption of lupine root by the Haisla and other peoples of the Northwest Coast (Pojar and MacKinnon 1994: 195). *L. nootkatensis* and *L. littoralis* were the species consumed (Pojar and MacKinnon 1994:194-5).

Kingsbury, summarizing early work done in the 1920's (1966:338) states that alkaloidal extracts of *Lupinus polyphyllus* were toxic to laboratory animals; neither part of plant from which the alkaloids were extracted nor the laboratory animal were mentioned. A number of alkaloids have been isolated from species of *Lupinus*; most are quinolizidine alkaloids, but piperidine and other alkaloids have also been found. Some European species of *Lupinus* appear to produce liver damage which is not due to alkaloid content, but North American species apparently do not (Kingsbury 1966:340).

'Cambium' foods (pine, spruce, aspen and hemlock inner barks)

The 'cambium' foods are collected during a restricted time period in the spring when cambial activity is at a maximum and there is a relatively thick layer of new active phloem,[13] the tissue eaten. The outer portions of inner bark contain more inedible components like tannins and polyphenols of various types (Airaksinen *et al.* 1986). Some of these constituents have been discussed in the previous section under the several types of trees. New phloem contains high levels of translocated sugars in the nutrient rich sap being transported downward to the roots, and, of course, a high percentage of moisture comparable to watery fruits like blueberries (Johnson Gottesfeld 1995). The 'cambium' of lodgepole pine contained 9.9 g of carbohydrate and 1.1 g of fibre per 100 gram portion. A second analysis of pine 'cambium' for soluble vs. insoluble fibre gave 2.88 g of insoluble fibre and 0.7 g of soluble fibre for 'cambium' from one locality, and 1.58g insoluble fibre and 0.49g soluble fibre for 'cambium' from a locality about 25 km away. These samples also contained 30 and 100μg of folic acid, a B-vitamin important in preventing certain kinds of birth defects, per 100 g of 'cambium'.[14] Spruce 'cambium' (*Picea* x *lutzii*) is probably similar to pine 'cambium'. Hemlock 'cambium' is more nutrient rich, with 25.9 g of carbohydrate, for 103 kilocalories per 100 gram portion, and 202 mg of calcium (Keeley 1980). Cottonwood (*Populus balsamifera* ssp.*trichocarpa*) 'cambium' is also similar to pine, but contains even more moisture; however, it is also a rich source of folate (Kuhnlein 1990). Likely aspen (*Populus tremuloides*) 'cambium', formerly eaten by the Gitksan, would also contain significant folate; other vitamins were not analysed for aspen 'cambium'.

Labrador Tea

Labrador tea (*Ledum groenlandicum*) leaves from eastern Canada contain moderate amounts of ß sitosterol, and small amounts of campesterol, and unidentified lipids with short retention time in chromatography (Hooper and Chandler 1984). Labrador tea stems and leaves also contain relatively high levels of triterpenoids; α- and ß amyrin, and taraxasterol account for relatively little of the total triterpenoid content (Hooper and Chandler 1984).

Kuhnlein and Turner (1991) list nutrient constituents of *Ledum groenlandicum* dry leaves. Although the leaves themselves are not eaten, many of these nutrients would be expected to leach out into the tea. Vitamin C (ascorbate) content is significant, at 98.2 mg/100 g, although it is unlikely that a person would consume tea from 100 g of dry leaves at one sitting. Other nutrients in relatively high amounts include niacin, calcium, phosphorus, magnesium, and iron. Consumption of Labrador tea could well provide the winter equivalent of a multi-vitamin/mineral supplement if consumed frequently.

Blueberries and cranberries

Black huckleberries (*Vaccinium membranaceum*), oval-leaf blueberries (*V. ovalifolium*) , and low-bush blueberries (*V. caespitosum*) were and are still eaten in relatively large amounts by the Gitksan. Cranberries (*Vaccinium oxycoccus* and *V. vitis-idaea*) were formerly eaten in more modest amounts. Nutrients contained in berries include carbohydrates, fibre, modest amounts of protein, thiamine, riboflavin, niacin, ascorbic acid, folic acid, and minerals (P, Ca, Na, Mg, Fe, Zn, Mn and Cu) (Johnson-Gottesfeld 1995), and a small amount of fat. The fruits of lowbush cranberry reportedly contain in addition the triterpenoid ursolic acid, salicylic acid, (+)-catechin, 1-aminocyclopronan-1-carbonic acid, ß-hydroxy-keto-butyric acid, 5-hydroxy-pipecolic-acid citric acid, cyanidin-3-galactoside, hyperoside, kaempferol, ketoglutaric acid, lycopene, malic acid, N-noncosane, quinic-acic, benzoic acid, silicon, vacciniin, and zeaxanthin[15] (Beckstrom-Sternberg and Duke 1994). *Vaccinium myrtillus*, a western North American and Eurasian montane to subalpine species, is probably more similar in composition to the blueberries and huckleberries eaten by the Gitksan. The fruit contains the phenolic arbutin, astragalin, cyanidin, delphinidin and several related glycosides, dihydroxycinnamic acid, ferulic acid, hyperoside, inositol and invert-sugars, lutein, m-coumaric acid, m-hydroxybenzoic acid, malvidin, monotropein, myrtillin, o-coumaric acid, p-hydroxybenzoic acid, paracoumaric acid, petunidin and petunidin-3-o-glucoside, protocatechuic acid, syringic-acid, tannin (in relatively large amounts), the triterpenoid ursolic acid, and vanillic acid (Beckstrom-Sternberg and Duke 1994.)

Several species of *Vaccinium*, which includes blueberries, western huckleberries, bilberries, bog cranberries and lingonberries or low-bush cranberries, have been used medicinally, in addition to their use for food wherever they occur. The large quantities of huckleberries and blueberries eaten by the Gitksan could make significant the intake of some of the non-nutritive components of the fruits such as tannins, polyphenols, triterpenoids, and so on. The influence of this intake on health is difficult to estimate.

Soapberries

The non-nutritive composition of soapberries (*Shepherdia canadensis*) was discussed in the previous section. The saponins probably impart the bitter taste to the fruit, and may produce the observed stomach soothing effect after consuming a rich meal high in oils and fats by reacting with the lipids in the stomach. Soapberries are usually consumed in small quantities, which would limit the intake of saponins at one time to levels which would be unlikely to cause any toxic effects. Soapberries provide a modest source of calories and fibre and are a source of carbohydrates; they provide relatively high amounts of riboflavin and ascorbic acid on a per 100 g basis, and are modest sources of other vitamins and minerals (Johnson Gottesfeld 1995).

Raspberries and Thimbleberries

Raspberries and thimbleberries are widely eaten by modern Gitksan, but were probably less important aboriginally because of the greater prevalence of ecological disturbance and land clearing in the Skeena Valley in modern times, and the availability of new methods of preserving raspberries such as making jam, canning and freezing them. They were both eaten seasonally in the past, and raspberries were sometimes preserved in berry cakes. Raspberries are an excellent source of folate. They are also a good source of fibre and carbohydrate. Thimbleberries, although not abundant, are a very good source of calcium and fibre; folate values have not been reported for thimbleberries. They are also a good source of carbohydrate and calories, and of calcium, magnesium and manganese. The leaves and stems of raspberries and thimbleberries are not used by the Gitksan for teas or medicines, nor are the shoots collected for spring greens, so exposure to cyanogenic glycosides and other components of stems and bark is unlikely.

Raspberry fruits are also reported to be active in vitro against several types of virus, including polio virus type 2, reovirus type 1, coxsackie virus type B, herpes simplex, and influenza virus.

Saskatoons

Saskatoons are eaten in relatively large quantities; they are good sources of fibre, carbohydrate, food energy, calcium, phosphorous and magnesium, and contain some vitamin C. Like other plants in the rose family, the stems and leaves probably contain cyanogenic glycosides, triterpenoids, and tannins (Cronquist 1981). The slight bitter almond tinge to the taste of the fruit may indicate presence of these compounds in the fruits as well, although no ill effects are reported from consumption of saskatoons in the literature. The fruits and stems have been used medicinally by various indigenous groups in North America (Moerman 1986) although they are not used by the Gitksan.

Wild crabapples and Rose hips

Wild crabapple (*Malus fusca*) is a good source of dietary fibre and of magnesium and contains minor amounts of thiamin. Wild crabapples were consumed in relatively large quantities in the winter because they were suitable for storage. Medicinal use and properties of wild crabapple were discussed above under medicinal plants.

Rose hips were sometimes consumed as a sort of jam by the Gitksan. No medicinal use of the rose plant (*Rosa acicularis*) was made by the Gitksan. Rose hips are renowned for their high vitamin C content; 100 g of rose hips without the seeds contains 413 mg. of vitamin C, far in excess of the recommended daily allowance for adult men (1035%). Rose hips are also good sources of dietary fibre, and contain minor amounts of other vitamins such as vitamin A. They also contain 10% of the adult male RNI (recommended daily nutrient intake) of calcium and magnesium. Rose hips provide amounts of carbohydrate and food energy comparable to other fruits. Rose hips (species not given) also contain a number of non-nutritive chemicals, including catechins, flavonoids, isoquercitrin, leucoanthocyanins, polyphenols, quercitin, and tiliroside (Beckstrom-Sternberg and Duke 1994). Catechin, discussed below under black hawthorn, has a number of biological activities, as do quercitin and isoquercitrin, discussed above. Polyphenols and flavonoids may also have activities, although activities would depend in part on which types are present. No activities are reported for tiliroside.

Black hawthorn

Black hawthorn (*Crataegus douglasii*) fruits were consumed in moderate amounts by Gitksan people in the past; they are rarely eaten at the present time. These fruits were consumed only cooked, and the seeds were not swallowed. No medicinal use of the bark or twigs of black hawthorn is recorded.

Although nutrient analyses have been carried out (Kuhnlein 1989), occurrence of non-nutritive phytochemicals in black hawthorn fruits is unknown. Black hawthorn fruits are good sources of carbohydrate, and contain fibre and various minerals in modest amounts. The fruits of the European species *Crataegus oxyacantha* contain a number of phytochemicals in addition to carbohydrates, sugars, fats, proteins and various vitamins. Some of these components have medicinal activities: procyanidin is antiviral and antibacterial, antiinflammatory and antiexudative, and antiedemic; aesculin is antiarthritic, antihistaminic, cardiotonic, and diuretic; catechin is antiarthritic, antiedemic, antiendotixic, antihistaminic, antihepatitic, has antiviral properties against influenza, herpes and hepatitis B virus (Che 1991), is antifungal, lowers blood cholesterol, promotes oral health, is antiulcer, and hemostatic, stimulates the immune system, and may be carcinogenic, although it is also reportedly cancer-preventative; and vitexin is antiarrhythmic, antibradiquinic, antidermatitic, antihistaminic, antiinflammatory, antiserotoninic, and hypotensive, and reportedly cancer-preventative (Beckstrom-Sternberg and Duke 1994). Hyperoside (=hyperin), discussed above under red osier dogwood is also reported to be present in the fruit. Levels of any of these constituents in the fruits were not reported, nor is their occurrence in the fruits of the western north American black hawthorn known.

Strawberries

Wild strawberries (*Fragaria virginiana*) are eaten by the Gitksan, but no medicinal use is made of leaves or runners. Strawberry fruits contain, in addition to moisture, fibre, carbohydrates and minor amounts of protein, 60% of the adult male recommended daily nutrient intake of vitamin C per 100 gram portion, and 22% of the RNI for magnesium. Several chemicals found in strawberry fruits (Beckstrom-Sternberg and Duke 1994) have medicinal properties: caffeic acid (found in coffee), catechin, catechol, chlorogenic acid (also found in coffee), the phenolics ellagic acid and gallic acid, and leucoanthycyanin, lutein, malic acid, oleic acid, p-coumaric acid, palmitic acid, quercitin, quercitrin, salicylic acid, and vanillic acid. Salicylic acid, quercetin, gallic acid and ellagic acid have been discussed above in the medicinal plants section, and catechin is discussed under black hawthorn. Caffeic acid is analgesic, has cancer preventative properties, is antiviral, bactericidal, and fungicidal, and a histamine inhibitor, is spasmolytic and aids the liver, though apparently it may also have tumor promoting properties; catechol shows in vitro activity against vesicular stomatitis virus (Che 1991); cholorogenic acid has similar properties to caffeic acid, except that it is also allergenic, but is not spasmolytic; leucoanthycyanin is an antioxidant; malic acid is bacteristatic, bruchiphobe, hemopoietic, and sialogogue; p-coumaric acid is antineoplastic, bactericidal, promotes bile formation, and inhibits synthesis of prostaglandins; oleic acid promotes anemia, but inhibits cancer and also promotes bile formation; palmitic acid is antifibrinolytic (prevents breakdown of fibrin, the protein which forms blood clots). Quercitrin is an aldose-reductase inhibitor, is antiarrhythmic, anticataract, antifeedant, shows activities against viruses and against influenza, is antihemorrhagic and antiinflammatory. According to the Phytochemical Database, it is also a central nervous system depressant, tones the heart and liver, is cancer preventative, stimulates bile production, is diuretic, lowers blood pressure, is paralytic, spasmolitic, is a vasopressor, has pesticidal and viricidal properties (Beckstrom-Sternberg and Duke 1994; Che 1991).

The fruits of the related wild strawberry, *Fragaria vesca*, are reported to be active in vitro against avian influenza virus, polio virus type 1, reovirus type 1, coxsackie virus type B, herpes simplex, and influenza virus (Che 1991.)

Bunchberry

Bunchberry fruits (*Cornus canadensis*) were consumed in small amounts by the Gitksan. Apparently they were used in berry cakes because of their binding properties, and they were also consumed raw as a snack. Bunchberries contain sugars and other carbohydrates, moisture, fibre, and modest amounts of minerals and vitamins.

Red Elderberries

Despite their reputation for toxicity, red elderberries were widely eaten by Northwest Coast peoples (Turner 1975:125). They are abundant and nutritious, although perhaps slightly toxic raw, as they are always cooked. Red elderberries are high in fibre and food energy, deriving more of their energy content from fat than other Northwest Coast fruits. In addition, they contain significant supplies of calcium, iron and magnesium. The medicinal uses and pharmacognosy of the red elderberry were reviewed in the previous section.

Kinnikinnik

Kinnikinnik (*Arctostaphylos uva-ursi*) fruits were eaten by the Gitksan. These apple-like fruits are one of the best sources of fibre in the traditional Gitksan diet, and also good sources of carbohydrate, food energy, and minerals. Studies lack values for vitamins. Kinnikinnik is well known in herbal medicine for the diuretic properties of its leaves, which contain the phenolic compound arbutin, along with a number of other phytochemicals (Beckstrom-Sternberg and Duke 1994), but leaves and stems were not used by the Gitksan, except briefly around the turn of the century for smoking, a common use of the leaves elsewhere in North America.

False Solomon's Seal berries

Medicinal use of the rhizomes was discussed under the medicinal plants section. The fruits are relatively high in calories and carbohydrates, contain a small amount of fibre, and have 122 mg of vitamin C per 100 gram portion. They also contain modest amounts of calcium and magnesium (Kuhnlein and Turner 1992).

DISCUSSION

There are problems determining concentrations of potentially interesting components of medicinal plants from the literature. It is also difficult to relate sparse clinical studies to the reported constituents, or to predict effects from the chemical data available. No data are available on compounds in smoke or smudges of medicinal plants, or clinical data on its effects when inhaled as a smoke. There is also no data on effects of inhalation of vapor or smoke from wilted or burnt material in the sweat bath. Further, a number of plants of interest have not been well characterized or assayed for biological effects. In particular, data on antiinflammatory effects, analgesia, antiviral effects, and clinical studies on diuretic properties or counterirritants are lacking.

From the perspective of phytochemicals and reported effects, several medicinal plants used by the Gitksan stand out: *Achillea millaefolium*, *Juniperus communis*, *Alnus* spp., and *Pinus*, *Picea*, and *Abies*. These plants are used by people around the world for medicinal applications, and contain an array of chemicals with antibiotic, astringent, diuretic, and analgesic properties. The importance and frequency of use in the Gitksan pharmacopoeia, however, may not parallel the reported number of active constituents, or the levels of antibiotic activity reported in the literature.

In addition, several important medicinal plants of the Gitksan like *Nuphar polysepalum*, *Oplopanax horridus* and *Shepherdia canadensis* have not been well studied. Brent-Collins (n.d.) and Black (1988) point out that plants which have specific effects on specific diseases are less highly regarded by Chinese herbalists than plants like ginseng, which have pervasive toning effects; Brent-Collins suggests that plants like this may potentiate the body's own immune system. The importance accorded to devil's club by the Gitksan and other Northwest Coast peoples could be due in part to such effects.

The lack of use of certain other plants which occur in Northwest British Columbia is also surprising from a phytochemical perspective. *Chimaphila umbellata*, *Arctostaphylos uva-ursi*, *Mentha arvensis*, *Fragaria virginiana*,[16] *Huperzia selago*, *Lycopodium clavatum* and *Urtica dioica* are obvious examples. From its affinities and pharmacological potential, as well as from ethnobotanical use and high value placed on it by other groups, one may also be surprised by the relative lack of use of *Aralia nudicaulis*

Nutritional components of tonic medicines and teas should not be neglected when considering the contributions plants make to health (cf. Young and Olson 1992; Johnson Gottesfeld 1995; Etkin and Ross 1983,1991; Etkin 1994). Several medicines used as tonics or teas by the Gitksan are documented to contain relatively high levels of vitamins and minerals, particularly juniper boughs and Labrador tea (Kuhnlein and Turner 1991). Anderson (1990) comments that a number of Chinese medicinal plants contain nutrients in short supply in the ordinary diet of poor Chinese people, again highlighting the interconnection of nutrition and medicine in restoration or promotion of health.

The presence of chemicals of potential non-nutritive activity in foods should also not be neglected. Certain foods such as raspberries and strawberries contain many compounds which may have biological activity in addition to nutrients.

Notes

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[1] A few medicines, such as valerian root, which are not applied or ingested by the Gitksan, but carried for protective purposes, will not be treated in this chapter.

[2] The therapeutic index is defined as: $TI= TD_{50}/ED_{50}$, or the dosage at which toxic effects are experienced by 50% of recipients divided by the dosage at which therapeutic effects are experienced by 50% of recipients.

[3] Tannin producing groups with representatives in temperate North America or familiar as sources of foods and drugs include dicotyledonous orders Laurales, Juglandales, Myricales, Fagales, Polygonales, Theales, Ericales, Rosales (Rosaceae), Proteales (Eleagnaceae), Cornales (Cornaceae); and monocotyledonous Cyperales (Cyperaceae) Typhales, and Zingiberales (Cronquist 1981).

[4] Prostaglandins are involved in inflammation reactions, and in the elevation of body temperature to produce fever.

[5] *Abies lasiocarpa* is closely related to the eastern North American balsam fir, and has recently been reclassified as a subspecies of *Abies balsamea*. Therefore, the chemical data from eastern balsam fir are likely to be applicable to the western subalpine fir as well.

[6] No significant mortality was observed in a brine shrimp bioassay except at the highest concentration; nor was significant activity detected with azocoll or azocasein bioassays (Feng n.d.:3)

[7] These include germbudine, germidine, germine, isogermidine, and neogermitrine.

[8] These include jervine, rubijervine and veratrine in the roots, and acetic acid in the rhizome.

[9] These include 1-alpha-hydroxy-alpha-methylbutyric acid, 1-alpha-methylbutyric-acid, acetic acid, deacetyl protoveratrine, isoribigervine, neogermidine, pseudojervine, and veratralbine. Acetic acid is reported to have diverse activities, including fungicidal, bactericidal, expectorant, mucolytic properties, but is widely present in plants. Possibly the use of powdered *Veratrum* rhizome as a snuff to clear the sinuses by the Central

Carrier (pers. observ.) and Tsimshian of Metlakatla, Alaska (MacGregor 1981) could be related to the presence of acetic acid in the rhizome.

[10] The full list of activities of quercitin given by Beckstrom-Sternberg and Duke (1994) is 5-lipoxygenase-inhibitor, aldose-reductase inhibitor, allelochemic, anti-tumor promotor, antiCrohn's, andiPMS, antiaggregant, antiallergic, antianaphylactic, antiasthmatic, anticataract, anticolitic, antidermatitic, antidiabetic, antiestrogenic, antifeedant, antiflu, antigastric, antihepatotoxic, antiherpetic, antihistamine, antihydrophopic, antiinflammatory, antileukotrienic, antilipoperoxidant, antioxidant, antiperiodontal, antipermeability, antipharyngitic, antiplaque, antipodriac, antipolio, antipsoriac, antiradicular, antitumor, antiviral, bactericide, calmodulin-antagonist, cancer-preventative, capillariprotective, clyclooxygenase-inhibitor, cytotoxic, HIV-RT-inhibitor, hypoglycemic, insulinogenic, juvabional, larvistat, lipoxygenase-inhibitor, mast-cell-stabilizer, mutagenic, pesticide, spasmolytic, teratologic, tumorigenic, vasodilator, xanthine-oxidase-inhibitor, cyclic AMP-phosphodiesterase-inhibitor.

[11] An alcohol extract of *Equisetum hiemale* was active, whereas an acid extract of *E. arvense* showed activity.

[12] Japanese species of *Aconitum* are the source of a drug called 'bushi' which has been the subject of several recent studies to determine the pharmacological properties of its constituents; a recent paper dealt with the analgesic, antiinflammatory and acute toxic properties of pyro-type aconitine alkaloids in this drug (Murayama *et al.* 1991).

[13] This active conducting portion of the phloem has been designated *leptom* by German authors (Esau 1967:272), but there is no technical term in English for the edible portion.

[14] These results were obtained by commercial laboratory analysis by Labstat of Kitchener, Ontario, on material I collected from two localities near Hazelton, British Columbia in May 1995. The previously reported proximate analysis of pine 'cambium' was performed by the same laboratory in 1993 on material from one of the two localities resampled in 1995.

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[15] I have omitted sugars, vitamins and minerals from this and the following list of phytochemicals obtained from Beckstrom-Sternberg and Duke 1994.

[16] *Fragaria virginiana* and *Urtica dioica* are used by the Wet'suwet'en and *Fragaria virginiana* is used by the Carrier of Central British Columbia (Johnson-Gottesfeld, unpublished fieldnotes 1994).

Chapter Eight

A Biobehavioural Perspective on Gitksan Plant Use for Medicine and Food

The use of plants for medicine by cultural groups is integrally related to emic concepts of the nature of disease, the nature of plants and the world view of each culture. In ethnomedicine, one must examine the use of plants for health promotion and healing in the perspective of the beliefs about the nature of disease causation and of healing of the culture being studied in order to understand the context and rationale of people's traditional practices. An understanding of the phytochemical and nutritional properties of the plants themselves also bears on the efficacy of plant medicines and plant food for healing and health promotion. Having examined Gitksan plant use in ecological and cultural context, Gitksan concepts of illness and wellness, and the known physiological properties of plants used for medicines, beverages and foods by the Gitksan, I would like to bring these strands of inquiry together in a biobehavioural or biocultural analysis[1] in an effort to understand the rationale for the use of plants for medicine and foods by the Gitksan people.

Concepts of disease causation form part of the whole culture and are entwined in cosmology and value systems. Plant uses are integrated into medical systems and form part of preventative and treatment modalities. The logic of the use of certain plants for specific purposes depends on concepts of causation of disease but also involves empirical observation of effectiveness at treating symptoms, especially for "naturalistic" diseases (cf Foster and Anderson 1978:53).[2] As "spiritual" concepts are not easily translatable into symptoms reflecting physiology, the biobehavioural paradigm is not applicable to diseases seen as having primarily "spiritual" causation, although it may bear on examination of the efficacy of supplemental treatments intended for the control of physical symptoms associated with a non-material underlying cause. Browner *et al.* (1988) explicitly limit their "empirical validation" methodology to consideration of illness in physiological terms.[3]

Although much medicinal plant use and many aspects of the therapeutic setting can be viewed as symbolic,[4] I believe that healers have refined their healing practices by observation and empirical testing[5] throughout human history, whatever the ultimate source of their power or healing knowledge. If plants are chosen for empirical properties as well as symbolic aspects or power on a non-material plane, it is likely that the properties of the plants chosen for treating different illnesses will have chemical or physical properties, comprehensible by Western science, which make them logical choices for healing certain conditions, given human physiology and the indigenous concepts of disease causation. Nina Etkin (1986), Carol Browner (1985; Browner *et al.* 1988), Bernard Ortiz de Montellano (1986,1990; Ortiz de Montellano and Browner 1985) and recently, Elois Ann and Brent Berlin (Berlin and Berlin 1996) have demonstrated the utility of this approach in seminal studies from Africa and Mesoamerica. Various North American ethnobotanical studies have also employed an approach which at least recognizes both the emic concepts of disease and healing, and the etic biochemical and pharmacological properties of the plants employed (Arnason *et al.* 1981; Camazine and Bye 1980; Gottesfeld and Anderson 1988; Turner and Hebda 1990). This approach has been dubbed biobehavioural by Etkin (1986, 1988).

Browner (1985) Browner *et al.* (1988) and Ortiz de Montellano and Browner (1985) have explored what they term "empirical validation" of the efficacy of plants employed as medicines within ethnomedical systems. Their contention is that it is likely that plants used in traditional medicine systems have been subjected to empirical examination over time by traditional healers, and that it is likely that plants which continue to be used in traditional practice may include pharmacologically active compounds which will produce desired physiological responses, given the emic concepts of disease causation and understanding of physiology.

They have delimited four levels " validation"; the highest level of validation of a plant medicine is achieved when the biochemistry of the plant has been elucidated and pharmacological effects of the plant have been demonstrated in clinical trials (Level IV). The lowest level of validation (Level I 'possibly effective') is shown when a plant is used in a similar manner for a similar condition where direct diffusion of medical practices is unlikely. The method is in essence a comparison between different systems of knowledge, made with the concept that independent lines of evidence are an empirical approach to confirming the efficacy of ethnomedical practices.

I find the approach useful, although the term "validation" is problematic, in that medicines or therapies not empirically "validated" may be assumed to be invalid, which is not the intention of Browner *et al.* or myself. The efficacy of medicines or therapies which are not "validated" in their terminology are simply not confirmed independently by similarity of use by other cultural groups, or by phytochemistry. The reader should keep this caution in mind, and understand that a comparison of two different systems of knowledge is being made without giving priority to the Western scientific approach. Examining empirical efficacy becomes more problematic when we deal with aspects of illness, or types of illness, for which biomedicine has no cogent models, which it has traditionally ignored, or for which there is no consensus on what the causes are or how best to treat patients, such as mental illnesses or "spiritual" conditions, as mentioned above.[6] In these instances, a comparison may not be useful or even possible without invalidating emic categories, though physiological sequelae might be examined in a comparative manner.

Biobehavioural analysis of medicinal plant usage employs the disease classifications and understandings of physiology and biomedicine as a reference point for comparison. There are some dangers inherent in this approach, as other cultural medical systems may have very different explanatory paradigms which cannot be simply mapped onto biomedical terms.[7] Concepts like *aire*, soul wandering, "hot" and "cold" in humoral systems, or "wind" in the Chinese system, are examples of explanatory principles which cannot be rendered in biomedical terms. The attempt to understand a different paradigm in western biomedical terms can be distorting and create an invalid analysis. That is the difficulty with the present tendency in western medicine to treat acupuncture as a technique, and to evaluate its effectiveness in treating a wide variety of biomedical conditions. At the American Anthropological Association session on Alternative Medicine and Health Care Policy (November 23,1996), an acupuncture practitioner got up and explained that when they get patients on referral, they then must rediagnose them according to the Chinese system and treat them on the basis of their own diagnosis. As one of the speakers at this symposium commented, to try to evaluate the efficacy of acupuncture at one focussed conference (which happened recently in the US) is like trying to evaluate all of pharmacy at one conference. The explanatory model and diversity of conditions and treatments is comparably vast (Claire Cassidy, November 23, 1996).

Notwithstanding the caveats given above, it does aid comparison of the different medical systems and their medicinal plant uses to make reference to biomedical understandings of the workings and dysfunctions of the physical body as a sort of common language. As Browner and Ortiz de Montellano (1985) comment, when one looks both at the explanatory model of the practitioner and what information exists about physiological properties of the herb(s) in question, one may be able to gain insights into the uses of the plants. This may indeed leave the ultimate causes of illness out of the comparison, as western science supports mechanistic views of the occurrence of disease while in other cultures spiritual models may be invoked in looking for predisposing causes for the illness of a particular person, and the role of pathogens may be seen as secondary.

In conducting a biobehavioural analysis of medicinal plant use, there are several approaches one can take. After documenting the specifics of the use of plants for healing and food and the emic concepts of health and illness, an examination of the known constituents of the plants used and their bioactivities can be made to see if the scientifically understood properties of the plants suggest their efficacy for treating the symptoms and conditions for which they are used (cf. Trotter and Logan 1986, Ortiz de Montellano and Browner 1985). This is possible for plant species which have been well characterized in terms of bioactive compounds, including toxins and nutrients, and for which some indication of typical concentrations of active chemicals is known; unfortunately this is a very small proportion of medicinal plants.

In most cases, the pharmacological data which do exist are indicative only, because of the lack of information about effective or toxic dosages or concentrations of physiologically active chemicals in plant parts used; more difficult to resolve in many cases, is the synergistic effect of the sum of components likely to be present in traditional medicines. Clinical studies of actual indigenous recipes could address some of these problems, but they are generally lacking, and may present their own difficulties of execution and interpretation.[8]

In the absence of firm, controlled data about the activities and efficacy of medicinal plant preparations for healing, some other approaches to the determination of empirical efficacy are possible. One approach is to compare uses of the same plant in widely disparate geographic and cultural settings to see if the people have (presumably independently) hit upon similar uses for the plants; this would be strongly suggestive of an empirical component to the use of the plant for certain types of medical conditions (cf. Browner *et al.* 1988, Young *et al.* n.d.).

Another approach is to examine intracultural variation in medicinal plant use (Trotter and Logan 1986; Johns *et al.* 1990, 1994; Berlin and Berlin 1996.) The plants about which there is greatest consensus regarding their efficacy and applications are most likely to be pharmacologically and clinically effective for the conditions treated. Trotter and Logan (1986) found that to be the case with Mexican-American medicinal plant use in Texas, where the most frequently used plants were found to be bioactive in brine shrimp assays, and also had compounds with bioactivity which would likely produce therapeutic effects for the conditions for which they were used. Berlin and Berlin and their collaborators (1996) have found a similar relationship between widely used plants and efficacy in a study of gastrointestinal conditions in the highlands of Chiapas and Tzeltal and Tzotzil medicinal plant use.

Methodology

In order to analyse Gitksan plant use from a biobehavioural perspective, I have employed the method of "empirical validation" of Browner and Ortiz de Montellano (1985) and Browner *et al.* (1988), which is based on agreement between different cultural groups about the types of uses of medicinal plants, phytochemistry and biological activities, bioassays, and clinical studies. As an independent type of confirmation of probable effectiveness of plant remedies, I will also employ the consensus approach suggested by Trotter and Logan (1986), Johns *et al.* (1990, 1994), and Berlin and Berlin (1996). Because my data were not collected with consensus validation in mind, the data set is incomplete. Agreement about the use and importance of medicinal plants will therefore be supplemental to the analysis based on agreement between groups, clinical studies, and pharmacological activity.

Validation at Browner *et al.*'s Level I requires location of independent records of use of a plant for similar purposes by other cultural groups.

Because of the overwhelming amount of data, and its variable quality, the survey of other uses which I have used in determining similarity of use by other cultural groups is not complete and systematic. My search of the literature emphasizes Canada and western North America, with sporadic inclusion of European and other sources (particularly Moskalenko 1986 for Siberia); I have tried to use well-researched sources which have accurate botanical identifications. In order to make the task more manageable, I have used review compilations where possible: Arnason *et al.* 1981; Moerman 1986; Kerik n.d.; and Turner 1981, 1982).

Issues of taxonomy and the terms in which uses are described, which vary from author to author, and with the time of recording, complicate ascertaining valid and appropriate similar uses by other cultural groups. It can be difficult to decide which ethnomedical uses reported by various authors, and thus already seen through variable filters, are sufficiently similar to count as confirmation.

Another factor which affects the reported number of groups using a plant is the question of what counts as a separate group. I have, for example, only counted use by "Cree" as one group, despite the fact there are significant ecological and other variations over the area from James Bay in Quebec to northwestern Alberta and northeastern BC, as well as the north-south dimension which takes in Plains Cree, and Woodland Cree. In the East, Cree are in contact with Montagnais and Inuit; in the west with northern Dene groups, and with the various Blackfoot, Blood and other groups of the western Plains. In contrast, in British Columbia, peoples of distinct language families, such as the Haisla and Tsimshian, may live short distances from one another, in virtually identical environments, and there may even be intermarriage between groups. These distinct situations obviously effect the distribution of plant use knowledge between groups. Despite these caveats, I have tallied separate groups wherever authors have called the groups by distinct names. I have, for example, counted Ojibwa, Cree and Montagnais as three groups, Quileute, Klallam and Cowlitz as three groups, and Sechelt, Halkomelem and Thompson as three groups.

In total, information from 111 North American indigenous groups (and three artificial groups: Maritime, Montana Indian, and California Indian) were examined. Forty five of these groups were from northwestern North America (Oregon to Alaska, west of the Rocky Mountains, and the remainder were from central and northeastern North America for the most part. Sporadic data from California, the American Southwest, and the southeastern United States, obtained from Moerman's compilation (1986), were also included. In addition, specific plant uses by "European", "Mexican", "Russian", and Tzeltal and Tzotzil Maya were included in a few instances.

Another indication of probable efficacy of medicinal plants is the proportion of groups potentially having access to a given plant which use it for similar purposes. Careful examination of plant range data, the areas occupied by cultural groups at the time of record and traditionally, and the ecology of the environments used by different cultural groups, would be necessary to seriously investigate this aspect of medicinal plant use. I have therefore not attempted such an analysis in the present study.

Tabulating phytochemicals, their activities, and bioassay results for the plant species of interest has also been challenging as the literature on phytochemicals is also vast and difficult to review systematically. I placed heavy reliance on Beckstrom-Sternberg and Duke's Phytochemical Database (1994) and the results of specific plant searches on the NAPRALERT database carried out in 1986.[9] These sources of data were supplemented with information from Schauenberg and Paris 1977, Arnason *et al.* 1981, and various other sources in the literature such as Chandler and Hooper's papers (Chandler et al 1979; Chandler and Hooper 1982; Hooper and Chandler 1984) and Hamon's alkaloid surveys of Saskatchewan plants (Hamon *et al.* 1980; Hamon *et al.* 1981; Hamon and Hindmarsh 1978). Bioassay data was obtained from McCutcheon *et al.* (1992, 1994, 1995) and Ritch-Krc *et al.* (1996b), studies dealing with antibacterial properties of medicinal plants used by Native peoples of British Columbia; Moskalenko (1986), which deals with antibacterial properties of Siberian medicinal plants; and Che (1991), a review article on anti-viral properties of plant extracts and phytochemicals. I have synthesized information from these sources to determine if Gitksan medicinal plant uses are confirmed at Levels II and III of Browner and Ortiz de Montellano (1988). Unfortunately, phytochemical and bioassay data are not available for all plants of interest used by the Gitksan. In these instances, only confirmation at Level I is possible.

Clinical studies of Northwest North American medicinal plants have been very few (Brocklesby and Large 1938; Piccoli *et al.* 1940; Justice 1966). This is partly because of the late settlement of the area by Eurocanadians and Euro-Americans, and the distinctiveness of the region's flora. Some studies of related species in northeast Asia have been done, but I have not located much information relevant to the species used by the Gitksan to date. No plant uses of the Gitksan are unequivocally validated by clinical data at Level IV.

Biobehavioural Analysis-Results:

Level I

I have examined the 37 medicinal plants known to be used by the Gitksan in terms of several possible kinds of confirmation. The first level (Level I of Browner *et al.* 1988) is that of use by at least one other group of people not in direct contact with the Gitksan for similar purposes (Table 8-1). In order to determine this, I have checked records in the literature for North America, with particular emphasis on the northwestern part where the flora is most similar and general compendia of medicinal plant use have sparse coverage, and checked several compilations to ascertain usage in other parts of Canada and the United States. All but three species used by the Gitksan have also been used by at least one other group. Due to the relatively restricted area of some of the plant ranges,[10] and the long-distance trading relationships of the Northwest, diffusion cannot be ruled out in all of these cases; however, confirmation of plant uses cannot be sought in different culture areas if the plants do not occur there. It is also necessary to make sure that the plants are used in similar ways by other cultural groups; in most instances at least some cultural groups used the plant in similar or consistent ways, but in several cases (*Cornus stolonifera, Calla palustris, Dryopteris felix-mas, Angelica genuflexa*) the Gitksan uses were considered to be disconfirmed by the lack of similarity of use to those of other groups.[11] The efficacy of use of eleven species in total was not confirmed at Level I (Table 8-5).

Additional confirmation is offered by the use of other related members of the genus in more widely dispersed areas, especially where these species are also used in similar ways. For this analysis, I have considered such uses suggestive of validation of the Gitksan uses, but have not considered the Gitksan uses validated by these records. Several species included in Appendix 1 fall into this category.

Level II

A different type of validation of plant use is offered by examination of the phytochemicals known to occur in the plant (and part) used medicinally, and consideration of what is known about the physiological effects of the compounds known to occur. There are several problems with this approach, but it is highly suggestive of empirical efficacy when active compounds with actions consistent with the therapeutic use do occur. This is Browner *et al.*'s Level II of validation. Problems include first, that most plants have been incompletely or not investigated phytochemically, and geographic and population variations, to say nothing of temporal variations throughout the year, in concentrations of phytochemicals in plant parts are not known. A second order of problem is that the activities, if any, of many phytochemicals are not known. Even where one does find reported properties in the literature, one usually does not know the concentration to be expected in plant parts, the concentrations likely to produce physiological effects, or whether the preparation methods used by the study population will likely extract the chemical in a form which will be physiologically active in a living person. The relationship between the effective dose and the toxic dose (therapeutic index) is likewise unknown except in phytochemicals which have been subjected to clinical studies. The presence of compounds likely to produce effects consistent with the ethnomedical uses is therefore an additional confirmation of the probable efficacy of the treatment from a biomedical perspective, but not a definitive proof.

In some cases active chemicals present may produce effects which are not sought by traditional treatment; the content of salicin, an analgesic, is probably not a factor in the efficacy of a preparation containing *Populus tremuloides* bark used for internal cleansing (that is, as a purgative.) If the remedy is efficacious for the intended purpose, it probably relies on other properties of aspen bark, or perhaps of the other constituents of the mixed decoction. I have compiled two tables which list the phytochemicals (Table 8-2) and the probable activities, bioassays, and clinical effects (Table 8-3) of the medicinal plants used by the Gitksan. Much of this information was presented earlier in Chapter 7.

Bioassays of the activities of plant extracts provide additional evidence suggesting confirmation of traditional plant uses, although Browner *et al.* (1988) include them in Level II as well. In the case of the plants used medicinally by the Gitksan, the most relevant assays are the in vitro assays performed by McCutcheon *et al.* (1992, 1994, 1995) and Ritch-Krc *et al.* (1996b), on a series of methanolic extracts[12] from plants known to have been used by British Columbia Native peoples. The published reports deals with antibacterial effects, anti-viral, anti-fungal, and some limited anti-cancer effects. Some confirmation is also suggested by positive antibacterial assays reported by Moskalenko (1986) for Siberian medicinal plants; however, these are less applicable, as only five of the species are identical to species used by the Gitksan, and do not represent the most important species.[13] Two whole plant extract antiviral assays which were carried out on plants used by the Gitksan are reported in Che (1991). The same difficulties of dosage and preparation seen with phytochemicals, as well as the additional difficulty of the great biochemical variability of bacterial and viral strains which cause disease, apply to the antibacterial and antiviral results. In six plants used by the Gitksan, the antibacterial assay results provide a definite validation of traditional uses. These are for *Achillea millaefolium*, *Alnus rubra*, *Nuphar polysepalum*, *Oplopanax horridus*, *Picea glauca* [14] and *Pinus contorta*. Three of these five are important medicines of the Gitksan. It is likely that *Alnus incana* and *A. crispa* would also show strong antibacterial activity if tested. The strong antibacterial activity of a European species of *Picea* corroborates the results obtained by Ritch-Krc *et al.* (1996). In several cases the bioassay results do not provide a confirmation or disconfirmation of Gitksan practices because the modes of use do not take advantage of the antibacterial potential of the plant. The most obvious example of this situation is the use of *Inonotus obliquus* for moxabustion. As an extract of the plant is not applied to sores, nor a decoction taken internally, its weak antibacterial properties are irrelevant to its ethnomedical use and neither confirm nor disconfirm the efficacy of moxabustion for reduction of swelling and pain relief in arthritis and rheumatism. Similarly, the strong antiviral activity reported for *Sambucus racemosa* (McCutcheon *et al.*1995) is unlikely to be a factor in Gitksan use, as the preparation is taken as an emetic by Gitksan people, which would likely cause it to be evacuated by vomiting before it could act as an antiviral agent.

Level III

Browner *et al.* (1988) distinguish a third level of "validation" where there is a known physiological mechanism whereby the active compounds in the plant are likely to effect the disease condition. This stipulation addresses the fate of the medicine in the body, and whether the active compounds are likely to reach and act on the affected tissues. Modes of preparation and administration of medicines will affect the probability that active compounds will reach the diseased area. Many substances are absorbed transdermally, for example, and enter the bloodstream (the basis of action of nicotine patches) which would allow systemic bioactivity from a topical application. Other substances may be inactivated by exposure to digestive enzymes and will not enter the circulation, rendering them ineffective in an oral preparation. I found it difficult to confirmation of ethnomedical uses at Level II from that at Level III from the information available to me, perhaps because I am not a clinician or human physiologist.

Level IV

The highest level of "validation" (IV) of traditional plant use proposed by Browner *et al.* (1988) is provided by clinical studies which support the efficacy of the traditional practices. Actual clinical studies have been carried out for only a couple of the plants used by the Gitksan; the results from several clinical studies on the hypoglycemic effects of devil's club extracts did not confirm each other (Smith 1983), so the clinical studies are only suggestive of the efficacy of the use of devil's club extracts to control diabetes. In addition, a couple of plants are known from clinical experience to be toxic, or have been used in herbology or clinically for different conditions than those for which the plant is used by the Gitksan. None of the plant uses of the Gitksan have to date been validated by clinical studies. Indian hellebore, for example, contains compounds which have been used in control of hypertension (Farnsworth and Bingel 1977); however, the Gitksan do not take decoctions or infusions of *Veratrum viride* roots internally, and do not use the plant for control of high blood pressure.

Discussion: Ascertaining Validation at Levels II-IV

Although most of the Gitksan medicinal plants in Table 8-4 do have known active chemicals, a careful analysis of the Gitksan uses and modes of utilization is required in order to ascertain if the efficacy of uses are confirmed by the presence of chemicals or bioassays of extracts reported in the literature. One must match the potential effects to chemicals known to occur in the plant parts used to arrive at a validation of Level II. Beyond this, one must consider whether the preparation and application of the medicine is likely to result in potential therapeutic action by the chemical constituents on the condition being treated (e.g.validation at Level III). This requires several leaps of reasoning. For example, considering the use of *Alnus incana* buds for skin conditions requires ascertaining if active chemicals are found in the buds. In this instance the flavonoids quercetin and isorhamnetin are known to occur in the buds (Table 8-2). Quercetin is listed as having antiinflammatory, antiviral, and antidermatitic properties (Table 8-3). It has shown in vitro activity against herpes simplex. Isorhamnetin is reported to have antihistaminic, antiinflammatory, bactericidal, and pesticidal properties (Table 8-3). Then one must analyse what types of biomedical conditions are likely to be included in "skin problems". These could include rashes and dermatitis, for which antihistaminic and antiinflammatory properties would be useful, sores and infections such as impetigo, caused by *Staphyloccus*, for which a topical bactericide would offer relief, herpes lesions, for which antiviral activity would help, or perhaps vermin infestation such as scabies or lice, for which pesticidal action would be helpful. For a condition like skin irritation or lesions, topical application is likely to be an effective mode of delivery. Therefore, the topical use of *Alnus incana* buds for skin conditions is likely to be efficacious, giving a validation of Level III.

Gitksan uses of eleven species were "validated" at Level II or higher (Table 8-5). Uses of several other plants would likely be "validated" at Level II or higher (based on phytochemical and bioassay results for closely related species) if bioassays or phytochemical work were carried out with the relevant species. Detailed analyses of individual plants which are confirmed at Level I and which are reported to have active chemicals, or which are not confirmed at Level I but which seem to have active phytochemicals, are presented in Appendix 1.

Confirmation by Consultant Consensus

The very preliminary and incomplete data on consultant consensus shows that devil's club is the most frequently mentioned medicinal plant, and it is still widely collected and taken for medicine. The consensus table (Table 8-6) was constructed from my interview materials; no data from published or unpublished reports by other authors of Gitksan uses were included. Some of these medications were mentioned in Smith (n.d.), Wilson *et al.* (n.d.) and Campbell *et al.* (1984). In interview records mentioning devil's club, fifteen different uses by twenty nine different consultants were found (out of 48 consultants whose responses were tallied). The most frequent use is as a tonic (7), followed by use for respiratory conditions (4), tuberculosis (4), arthritis (4), blood or heart medicine (4), and purification or enhancement of luck (4). Stomach ailments, stomach flu or ulcer were mentioned by 3 consultants, as was cancer, and topical use for wound dressings. Headache was mentioned by two consultants, and 'cure-all", flu, "cleanser" (=purgative), and smudging were mentioned by one consultant each.

The second most frequently mentioned plant is yellow pond lily. As far as I know, this plant is no longer in widespread use. Seventeen consultants mentioned 11 different uses for the rhizome of *Nuphar polysepalum*. Treatment of tuberculosis was the most frequent use mentioned (6). Poultices for arthritis (3), sores and wounds (3) or fractures (4) were the next most significant area of use; together the three categories give 9 reports of the use of the rhizome as a poultice. Treatment of aches and pains, mentioned by one consultant, gives 10 reports for use as a poultice. Use for general sickness was mentioned by two consultants. Use as a contraceptive was also mentioned by two consultants. This was the only medicine mentioned for contraception by Gitksan people. Liver, intestine, tonic and appetite stimulation were each mentioned by one consultant.

Veratrum viride, Indian hellebore, was mentioned in interviews by fourteen consultants, and casual conversation reveals that it is collected and used frequently by the Gitksan at the present time. Most of the present use, and the most frequently mentioned uses in Table 8-6, are not for physiological conditions, but for its protective and spiritual properties (8 for purification, 6 for protection, 5 for hunting luck, 3 for bathing[15] , 1 for nightmare, 1 for sleepwalking, and 2 for "killing germs"[16]). Physiologically based uses include use as a snuff to clear sinuses (2 reports), and use for skin sores, dandruff, and hair (2 reports).

Reports of use of the pitch (4 reports) and bark (8 reports) by nine consultants makes "balsam" or *Abies*, the fourth most frequently mentioned medicinal plant. Spruce or pine pitch, bark or tips are also mentioned by nine consultants. Barks of all are still collected for use in mixed medicinal decoctions, often with devil's club, and pitch is collected for topical application. Eight consultants mentioned uses of *Juniperus communis* for tonic mixtures with devil's club and the conifer barks mentioned above (5), and for luck (1) or as a smudge (2); five mentioned of red elderberry as an emetic. Three consultants each mentioned use of soapberry berries, stems or leaves as medicine, and three mentioned *Inonotus obliquus* or *Fomes ignarius* for moxabustion treatment of arthritis or swelling. Other medicinal plants were mentioned by two or fewer modern consultants, although some were also recorded in the 1920's by Harlan I. Smith (n.d.), or in the modern local reports previously mentioned.

Empirical efficacy of all of the species listed in Table 8-6 is also validated at Level II or above on the basis of active phytochemicals or bioassays (see Table 8-5). The species confirmed by five or more Gitksan consultants also were used by 7-33 other groups, showing substantial agreement between the species considered most likely to be efficacious by two different methods of confirmation.

Biobehavioural Analysis-Gitksan ethnomedical concepts

To date, I have presented an evaluation of the likely efficacy of Gitksan medicinal plants which has been carried out simply by agreement within the society or between cultural groups; or by reference to phytochemical properties, bioassays, and a biomedical construction of what may be involved in various reported disease states, to deduce whether the plants may produce effects which would likely be effective for the uses made of them by the Gitksan people. Browner (1985), Browner *et al.* (1988) and Ortiz de Montellano (1984, 1990) have emphasized the necessity to frame the activity of the plants in terms of the effects sought by indigenous practitioners in terms of their understandings of the nature of disease and therapy. They provide examples of ethnomedical concepts–that uteroactive chemicals should be heating and drying, that headache involves too much blood in the head–and show how herbs selected by indigenous herbalists and healers do provide the activities deemed necessary, as well as (usually) producing a therapeutic effect that biomedicine would also recognize; that is, they are empirically efficacious in a given ethnomedical context. Browner *et al.* (1988) go on to mention that determination of the congruence of the ethnomedical perception of efficacy with a therapeutic outcome framed in biomedical terms is a separate area of inquiry.

Aside from concepts like spiritual cleansing, luck bringing and protection, which cannot be evaluated in biomedical terms, there are several aspects of Gitksan concepts of healing which do affect choices of plant therapies and how they are used. For example, Gitksan people believe that illness must be treated holistically. This means that food and self-restraint or control[17] will be part of the recovery process, and that taking medicines will be incorporated into a healthy lifestyle, as in the prolonged use of tonics. Gitksan in general expect to take medicines over a relatively long period of time in order for them to be effective. I was often told that one should take a medicine "whenever you feel thirsty", in effect, to replace intake of pure water with intake of medicine, to immerse oneself in therapy.

Another aspect of Gitksan treatment is that dirt or contamination, at both spiritual and physical levels, are implicated in disease causation. Therefore, cleansing (purgative or emetic herbs) may be employed to treat a variety of ailments; the clearest example is the treatment of influenza or inability to eat with a powerful emetic, in order to leave the digestive tract clean and ready to receive healing nourishment. The use of balsam (*Abies*) pitch and oolachan grease to treat "paralysed arthritis" was explained in the same way; a strong cleansing would then allow the restored body to regain its natural function.[18]

In the first instance, one would have to rate use of elderberry root as an emetic to be an effective treatment for influenza[19] and serious sickness; the emetic effects are confirmed by other groups, and by clinical reports of purgative chemicals in the bark and roots of elderberry. The congruence of the Gitksan and biomedical understandings would not be as great; physicians do not usually consider emesis or purgation to be necessary for recovery from viral illnesses. In the second instance, the purgative effects of taking balsam pitch orally are not documented in the clinical literature, and no reported purgative chemicals are included in the incomplete list of chemicals present in balsam pitch. The efficacy of this use cannot be confirmed by phytochemistry or clinical experience.

An important Gitksan concept is that the immaterial essence of a thing is released in smoke or by burning. Before the arrival of the missionaries, the dead were cremated to release their spirits (with the exception of shamans, whose remains were buried). Food offerings are still made to the spirits of the dead at times by throwing fish or berries into the fire. This perspective makes it logical that spiritual conditions, including serious conditions such as coma or (possible) stroke (***godalol'x***–see Chapter 6), as well as substance abuse, should be treated by burning powerful medications and exposing the patient to their smoke.[20] Devil's club, Indian hellebore, juniper, and cow parsnip are among the herbs used as fumigants for "germ killing" and for treatment of spiritual ailments, and ?mental or ?neurological ailments. Some confirmation of such an approach is offered by other groups uses of several of these plants (especially Indian hellebore and juniper) as fumigants for similar purposes, and by personal observation of the calming effect of ***malgwasx*** smoke inhalation. In terms of this type of use, the only thing that is presently available as possible confirmation by phytochemistry is the presence of various aromatic compounds used "for perfumery" (Beckstrom-Sternberg and Duke 1994) in plants like juniper. No studies have been made, to my knowledge, of the compounds formed in the smoke of burning Indian hellebore rhizome, for example, or the effects produced by breathing them. A variation of releasing the essence of medicinal plants by smudging perhaps is burning certain herbs on the rocks in the sweat hut, or the herbal steams created by throwing infusions of medicinal plants on the rocks.

Gitksan people generally hold that medicinal plant efficacy depends on how plants are gathered and attitude and preparation of the gatherer and user, that is, on spiritual dimensions as well as deterministic material properties. This conception follows naturally from the holistic Gitksan world view, and the concept that there are both material and immaterial properties to all things. Medicines are NOT simply modelled as: plant–> constituents–>body [as machine] –> deterministic action–>healing result, which is a schematic depiction of the view of medicinal plant usage common to economic botanists and natural product pharmacologists and chemists. This is obviously an area of lack of congruence of the Gitksan and biomedical models of medicinal plant efficacy.

An interesting area of comparison is in the area of holistic conceptions of health. In modern western medical models, some areas such as public health and preventative medicine do emphasize holistic conceptions of health, and advocate a mixture of physical activity, healthy diet with appropriate nutrients, and minimal intervention therapies for disease. These have definite parallells in the Gitksan holistic conception of health, including purification–>cleanliness, self discipline (sacrifice to prove worthiness) and hard work and prerequisites to health and goodfortune (not separate realms for Gitksan people). One of the consequences of this perspective on health for medicinal plant use is the pervasive use of tonic mixtures, and the relatively weak separations between tonics and respiratory illness medicines, and tonics and "cleansers". General health enhancement, sickness prevention, and treatment is the goal. One might comment from the biobehavioural perspective that these mixtures appear to have activities against viruses and bacteria, and also to contain important vitamins such as vitamin C, which prevents scurvy and are postulated to have a role is prevention of viral illness such as colds and influenza (see references cited in Black 1988:154-155 on Vitamin C and immune function). The fact that these plants may be diuretics (such as juniper) or have laxative properties (e.g. devil's club, by anecdotal evidence) would give them mild cleansing properties, a feature that would be consistent with Gitksan notions of health promotion.

Foods and medicines are both necessary to achieve and maintain health in Gitksan and in western biomedical ideas, although we normally think of foods and medicines as separate categories–despite the fact many of us drink milk or orange juice because it is good for us, that is, contains calcium and protein, or vitamin C. The Gitksan, too, feel that various foods are healthful, and suggest that meat and fish broth are especially appropriate foods to help restore health in a seriously ill person. People generally feel that traditional foods gathered from the land are "healthy" in contrast to store bought foods, sweets and snack foods–an opinion likely to be reinforced by public health nurses and dietiticians to some extent, though likely not for the same reasons. Fasting, or abstinence from food, probably ingestion of medicinal teas, using herbs that produce sweat, another means of cleansing, or purgative or cleansing herbs, are other ways that food and other substances are regulated in the body to help produce health. As Nina Etkin and her co-workers have pointed out (1986, 1988, 1994; Etkin and Ross 1983, 1991), foods may have various medicinal components as well as micro- and macro-nutrients. Medicinal teas may also contain nutrients, especially vitamins and minerals. Food and medicines together may act in concert to enhance or maintain health. The Gitksan tend to see foods (appropriate foods, such as wild meat, berries, fish, or oolachan grease) as health giving or restoring. Substances taken in can also prevent good health, such as consumption of alcohol.

Some aspects of Gitksan concepts of cleanliness include kinds of things that would be understood in Western terms as hygiene. Appropriate disposal of dirty diapers and menstrual materials, and careful cleansing of hands before preparation of food would represent good health practices in Western practice as well. Concern over fecal contamination, and possibly proscriptions of careless disposal of meat or fish parts, ostensibly to avoid offending the spirits of other creatures, also would promote health in ways that public health officials would agree with. The use of separate pots or wooden cooking boxes for preparation of medicines and foods, especially of concern when cooking in porous wooden boxes and before the introduction of soap for cleaning, makes sense in Western terms as well, although the reasoning behind the practices would differ between Gitksan and European peoples.

Results: Biobehavioural Analysis of Specific Plant Uses

As I discussed previously in Chapter 7, not all of the most frequently used medicinal plants of the Gitksan have been sufficiently well studied from a phytochemical or clinical point of view to offer much information for empirical confirmation of Gitksan uses.

Devil's club is certainly the most frequently mentioned and most widely used medicinal plant of the Gitksan today, a prevalence found over much of its range. Thirty-three other groups also report using devil's club for medicine. Phytochemistry offers little to the understanding of the mechanisms of action of devil's club; contradictory clinical and laboratory reports exist on potential antidiabetic or hypoglycemic properties (see Table 8-3). The only confirmation that western science can presently give to the efficacy of devil's club for any of its traditional uses is a recognition that methanolic extracts show strong activity against *Mycobacterium phlei*, and *Staphyloccocus aureus*, methicillin sensitive strain, inhibit *Salmonella typhimurium*, and partially inhibit respiratory syncytial virus (McCutcheon *et al.* 1992, 1994). The antibacterial and antiviral activities give some support to use for respiratory infections or TB, and as wound treatments, but provide no information about efficacy for a variety of other physiologically based therapeutic uses: arthritis treatment, cleansing properties, tonic properties, headache treatment, stomach medication (except perhaps *Salmonella* poisoning), or anti-cancer properties. Perhaps a more important level of potency in Gitksan perception is the spiritual power of devil's club, which leads to various cleansing, purifying and smudging uses; these are outside of the sphere of western biomedicine.

Indian Hellebore

Although Indian hellebore or *Veratrum viride* has been used for medical preparations in North America (Tyler *et al.* 1981, Farnsworth and Bingel 1977), the medical uses have largely been for control of hypertension, not a use which appears in the ethnomedical roster. The most significant uses of Indian hellebore for Gitksan people are the protective and purifying spiritual uses, again outside of the realm of western biomedicine (although I suspect that tranquilizing or calming psychotropic chemicals would be found in the smoke if it were studied). Leaving aside these uses, Gitksan uses of the present or past include use for skin ailments, hair or scalp conditions, snuff for sinus, and topical analgesia (and "lung hemorrhage" in a mixed topical application from Smith n.d.). Anti-parasitic, anti-louse, pesticidal and fungicidal properties are attributed to several alkaloids present in the roots, and to acetic acid in the rhizomes of *V. viride*. The most frequent medical use reported by other groups for *Veratrum viride* is as snuff to clear sinuses. It is empirically effective for this purpose, and mucoirritant properties are reported to be present for chemicals in the root.[21] Many Gitksan are aware of its power to induce violent sneezing, but may regard this as a negative side effect to be avoided if possible, rather than the object of therapeutic use. Another frequent reported use of *V. viride* is as an emetic, for which it is also doubtless effective. Emetic properties for alkaloids in the roots are also reported in Table 8-3. The Gitksan regard the potential toxicity of Indian Hellebore as too high for internal use[22] and have preferred to use *Sambucus racemosa* for its powerful emetic properties when such treatment is desired. Analgesic chemicals are reported in the root (see Appendix 1) suggesting that the now discontinued practice of using the leaves for analgesia, and using a medicinal mixture with "root" (rhizome or root) for rheumatism may also have been effective.

Yellow Pond Lily

Yellow pond lily *Nuphar polysepalum* (*N. lutea* spp. *polysepala*) is the second most frequently mentioned medicinal plant in Table 8-6. Although McCutcheon *et al.* (1992) report strong antibacterial properties for yellow pond lily, this property does not support the efficacy of many of the traditional uses. It does lend support to the efficacy of yellow pond lily for tuberculosis treatment. The former epidemic proportions of TB among the Gitksan, and the fact that a number of my consultants were tuberculosis survivors who had been treated with this plant may explain its frequency of mention. Several other uses of yellow pond lily suggest possible steroidal activity: use as a topical antiinflammatory for swollen joints, as a healing agent for fractures and sores, and as a male contraceptive. The chemical characterization of the rhizomes for steroids or other antifertility and antiinflammatory compounds has not been carried out. Some suggestive evidence is offered by the detection of ß-sitosterol in *Nymphaea*. The properties of the alkaloids known to occur in *Nuphar lutea*, nupharine and related compounds, are not supportive of the ethnomedical uses: they are hypotensive and antispasmodic (see Table 8-4).

Conifer barks and pitches

The use of conifer barks and pitches by Gitksan people for mixed decoctions for tonics or respiratory illnesses, and as wound dressings seem quite straightforward from a biomedical perspective; the barks and pitches do contain known antibacterial and antiviral compounds, and at least some types have been validated by *in vitro* studies of antibacterial properties.

Unfortunately, the medication considered strongest by Gitksan people, balsam (*Abies lasiocarpa* or *A. balsamea* ssp. *lasiocarpa*) was not tested by McCutcheon *et al.* (1992, 1994, 1995), nor has it been well characterized chemically. However,the results obtained by Ritch-Krc *et al.* (1996b) suggest only a modest degree of antibacterial activity for *Abies lasiocarpa*. Of three bacterial strains they tested, *Abies lasiocarpa* pitch showed moderate inhibition of *Staphylococcus aureus*, but did not inhibit *Pseudomonas aeriginosa* or *E. coli*. Whether it would prove to have cleansing or purgative properties when taken internally, and whether there would be any biomedical confirmation of value for complaints like arthritis or difficulty walking is not at present clear. Biomedicine would not see the connection between cleansing or purgative properties and the recovery of walking function which was present in the ethnomedical presentation of the case mentioned earlier.

Juniper

Common juniper has been extensively studied phytochemically and for its clinical properties. It is circumboreal in distribution, and has been extensively used in Europe as well as North America. Other juniper species are widely used around the world. *Juniperus scopulorum* has not been studied for its clinical effects or phytochemistry as far as I have been able to determine. Therefore, the following discussion will focus on *Juniperus communis*. A number of active chemicals have been isolated from the stems, bark, leaves and "fruits" (berry-like fleshy ovulate cones) of common juniper. In addition, various bioassays have been carried out which demonstrate antiviral (Che 1991), antibacterial (McCutcheon *et al.* 1992), and antitumor (Belkin *et al.* 1952) effects. Indian research reports abortifacient and emmenagogue properties (Agrawal *et al.* 1980; Saha *et al.* 1961). In addition, phytochemical activities suggest antiinflammatory, diuretic, spasmolytic, cancer-preventative, febrifuge, antilithic (used for kidney stones), and other properties. Camphor, present in small amounts, is a CNS stimulant, abortifacient, irritant, "deleriant", and convulsant, among other properties.

From the Gitksan perspective, at least some common juniper have 'supernatural' associations, and presumably, strong spiritual power as well as material healing properties (see taxonomic discussion Ch. 5). The name of the spiritually potent juniper is ***lax̱sa lax̱nok̲***, or ***sgannax̱nok̲***, 'boughs of the supernatural', or 'supernatural plant'. In addition to its use in mixed decoctions for tonics or to treat respiratory illness, likely to be efficacious from the biomedical perspective, juniper is used for cleansing and smudging purposes, showing once again the melding of spiritual and material potency also shown by Indian hellebore and devil's club.

Red elderberry

The use of red elderberry as an emetic seems straightforward from the perspective of biomedicine; elderberry bark, and particularly the roots, do contain toxic chemicals known to have purgative or nauseating effects (Table 8-3). Culturally, the Gitksan find use of cleansers, emetics or purgatives, an important strategy for health maintenance and return to normal function in a diseased state. The use of red elderberry for illnesses such as influenza is an obvious instance of this approach to therapy (see section on ethnomedicine above).

Plants as Foods and Medicines

I have at times alluded to the nutritional content of medicinal decoctions or infusions, and in Chapter 7 and Tables 8-7 and 8-8 to the potentially medicinal components of foods such as raspberries and strawberries. Gitksan plant use supplies both nutrients and other types of biologically active compounds in foods, beverages and in medicines which are taken internally. Although we tend to think of "food" and "medicine" as separate categories, Etkin (1986, 1988, 1994) and Etkin and Ross (1983, 1991) argue cogently for consideration of total plant exposure. Some plants are used by the Gitksan for both food (or beverage) and medicine.[23] The most noteworthy example is soapberries, *Shepherdia canadensis*. As mentioned earlier in Chapter 4, soapberries are a prized desert for feasts and other occasions, served as a whipped (and now usually sweetened) froth. Soapberries can also be used for medicine, especially for arthritis, although the neighbouring Wet'suwet'en use them more often for "sore stomach". The therapeutic dose is one spoonful of berries. I also mentioned several other uses of the soapberry plant for medicine. The new inner bark or "cambium" of pine, spruce and even balsam (*Abies lasiocarpa*) is used as food; there is a very short season in the spring when the "cambium" is still sweet and tender, before it has matured and accumulated secondary compounds. After this point in the growing season, conifer barks have accumulated more secondary compounds and are no longer very digestible; at this point they are good for medicine. Spruce pitch can be used as chewing gum– or as medicine. Labrador tea leaves can be brewed as a beverage; a stronger decoction can be taken as a tonic or medicine. Lupine roots were reported by one elder to have been consumed by her mother; she considered them to have been perhaps a "medicinal" food (see Chapter 4).

For some food and medicine plants, the parts used for food and medicine are different. The barks of several of the fruit-providing shrubs or trees (including soapberry mentioned above) are also used in mixed medicinal decoctions. Cherry (*Prunus pensylvanica*), highbush cranberry (*Viburnum edule*), and wild crabapple (*Malus fusca*) are or were used for medicine. The peeled young flowering stalks of cow parsnip *Heracleum lanatum* are appreciated as a spring green vegetable, and are a source of vitamins. Older stalks, or other parts of the plant, which contain more furanocoumarins, are considered poisonous. The inedible root of cow parsnip can be used as a poultice for sore joints at any time of the year.

Negative Evidence

As I reviewed the ethnobotanical, herbal and pharmacognosy literature, I was struck by ethnomedical use, or reported activities of, plants which occur in northwestern British Columbia, which are not used by the Gitksan for medicinal purposes. I have compiled two tables of plants known to occur in the Gitksan area which are not used as medicine by the Gitksan, showing the number of groups reported to use the plants, and some information on the phytochemicals or activities of the plants in question (Tables 8-7 and 8-8).

Several plants not used by the Gitksan stand out on the chart for numbers of activities, and also for numbers of groups which use them medicinally. Perhaps the most noteworthy is *Mentha arvensis*, a small wild mint which makes a pleasant tasting tea. In my survey of plant uses, it was used by 12 separate cultures. In Moerman (1986) it is one of the most used plants in North American, with 94 records of use by different cultural groups. The Ethnobotany Database maintained by the US Department of

Agriculture also lists a number of uses by different peoples, including many Chinese applications, and some from Nepal and Japan, as well as Mexico and Europe. Twenty-one active chemicals (not counting those which only show activity as insect repellents or pesticides) are found in *Mentha arvensis* (see Table 8-7); various of these (carvone, limonene, menthol, menthone, myrcene, pulegone, and rosmarinic acid) are reported to occur up to 24,000 to 28,000 ppm (up to 2.4-2.8%) in the leaf or plant (Beckstrom-Sternberg and Duke 1994), likely in enough concentration to produce therapeutic effects (see Appendix 2).

Another plant used by a number of groups in my survey is chokecherry, *Prunus virginiana*. 27 groups were reported to use chokecherry. Moerman (1986) also includes it in his ten most used species in North America, with 92 reported records of use of chokecherry for medicine. Prunasin and tannins are found in *Prunus virginiana*; the prunasin is an effective antitussive and antispasmodic, and *P. virginiana* bark has been collected commercially for cough preparations (Claus et al 1970). The Gitksan use the related *P. pensylvanica* instead for medicine, as apparently do the Wet'suwet'en, although both species are about equally frequent in the environment. It may well be that the pin cherry is also an effective antitussive or has other therapeutic properties. No information was located on the properties of pincherry bark.

Arctostaphylos uva-ursi, bearberry or kinnikinnik, is well known in European herbology as a treatment for urinary tract infections. The only use the Gitksan make of kinnikinnik is the traditional harvesting of the fruits for food. Kinnikinnik contains 23 active chemicals in the plant or leaf, including arbutin at 5-12% in the leaf. Arbutin has a number of properties; it is antiseptic, antitussive, bactericidal, kills *Candida*, is insulin-sparing, and is a urinary antiseptic. *A. uva-ursi* contains various diuretic compounds (arbutin, hyperin, isoquercitrin, myrcetin, oleanolic acid, and quercitrin), also helpful in urinary tract infections. Tannin is reported to be antinephritic (Beckstrom-Sternberg and Duke 1994). Schauenberg and Paris (1977) comment that the antibacterial activity in the urinary tract is more effective if the urine is alkaline; baking soda is sometimes taken with bearberry medications to help promote alkaline urine, and to enhance activity against coliform infections. A number of other potential therapeutic properties are recorded for phytochemicals found in *A. uva-ursi*: antidiabetic, anticancer, antiviral, bactericidal, liver toning, hypotensive, spasmolytic (also helpful for bladder infections), antiallergic, antianaphylactic and antiasthmatic properties, antimutagenic, and so on. Various potential toxic or non-therapeutic effects can also be produced by *A. uva-ursi* phytochemicals, including cytotoxic, teratalogic, abortifacient, antifertility, antigastric, CNS-depressant, psychotropic, paralytic, spermicidal, androgenic or antiandrogenic and other hormonal properties (ß-sitosterol) (see Appendix 2). Fourteen different indigenous groups use *A. uva-ursi* for medicine, four of these for kidney or urinary problems, and several as an antidiarrheal, presumably for the tannin content (6-20% of the plant-(Beckstrom-Sternberg and Duke 1994)); several other groups use it only as a smoking herb.

Pipsissewa, *Chimaphila umbellata* in the wintergreen family,[24] was used medicinally by 22 groups of indigenous people (Tables 8-7 and 8-8). It is a relatively common understory plant in Gitksan country but little noted and not utilized by the Gitksan. One consultant noted its resemblance to *Arctostaphylos uva-ursi* (to which it is related) (see Chapter 5). Like *Arctostaphylos uva-ursi*, *Chimaphila* contains arbutin in substantial amounts (7.5%) and another compound of similar activity, chimaphilin (at 0.2%), which act as urinary-antiseptics and diuretics. Other phytochemicals with antiinflammatory, bactericidal or diuretic properties include avicularin, kaempferol, and ursolic acid. Methyl salicylate, also found in *Chimphila*, is analgesic and antipyretic as well as anti-inflammatory and effective for sore muscles and rheumatism (it is related to salicin and to ASA-acetyl salicylic acid, the ubiquitous aspirin), and a carminative. ß-sitosterol is also present in *Chimaphila*, but no indication of its abundance is given in Beckstrom-Sternberg and Duke (1994). In all eleven active chemicals have been isolated from *Chimaphila umbellata* (see Appendix 2). It has been commercially harvested in the Grant's Pass area of southern Oregon (Baker, presentation at 1989 Ethnobiology meetings, Riverside California).

The last plant medicine I will consider here is willow bark (genus *Salix*) known since at least the Middle Ages in Europe as an effective remedy for fever and pain. *Salix alba*, a European species used also for wickerware, has been a commercial source of salicin, used since the late nineteenth century for the manufacture of ASA, a chemically modified form of salicylic acid which is less corrosive to the stomach when taken internally (see Appendix 2 for complete active phytochemicals and activities). Willow species are widely used in North America as well for a variety of conditions, including use as a febrifuge or for various kinds of topical analgesia, and dressings for wounds, mixed decoctions for various types of sickness, and numerous other uses (see Moerman 1986, and various references of Turner, Chalifoux with Anderson 1980, Kerik n.d. for more on the ethnomedical uses of various willow species.) The Gitksan, however, apparently use willows only for technological purposes, despite their common occurrence in most habitats from river bottom to alpine.

The naive empirical model seems to assume that if a plant is potentially useful, it will probably be discovered and used, in an "appropriate way", by local populations. One might assume that common plants with numerous active chemicals, such as the several I have discussed above, would have a high probability of being chosen for ethnomedical use. However, history, cosmology, culture, symbolism, concepts of wellness and illness, and the availability, frequency, and characteristics of alternative plants with similar properties must all be taken into account in understanding which plants may be selected as medicines by a given local people. It is evident many potentially therapeutic plants (and animals) occur in the environments of different peoples which are not utilized for medicine.

Ethnomedical concepts of appropriate therapy, and other species also present in environment with similar potential activity must both be taken into account in attempting to understand use and non-use of particular medicinal plants. The same sorts of factors which enter into cultural choices about which plants and animals are utilized for food also enter into cultural choices about potential medicines. The sorts of models used to explain diet breadth might be one way to address the use or non-use of medicinal plants present in a people's environment (cf O'Connell and Hawkes 1982).

As an example, the non-use of willow (or aspen) for pain relief by Gitksan may be related to cultural factors. It seems to me that there is not a strong emphasis on pain relief or analgesia, or fever reduction, as desired properties of effective medicines in Gitksan descriptions of the uses of medicinal plants. Whether this is due to a lack of concern with pain and fever, other approaches to therapy such as extensive use of the sweat hut or moxabustion, other herbal treatments such as pond lily poultices or topical application of *Veratrum* leaf for local pain and inflammation, or a preference to treat the perceived underlying cause of the condition is unclear. It may also be that fever reduction is a property of some of the mixed decoctions commonly employed for sickness, so that the perceived need for a febrifuge might not arise.

DISCUSSION

Factors influencing the similarity of medicinal plant uses between cultures.

Cultural factors influence understandings of disease and approaches to therapy, giving a certain similarity in general medicinal uses of plants between cultures in the same areas. I have sometimes called this kind of similarity "cultural style" when referring to approaches to ethnobiological classification. Although direct diffusion can be a factor, I believe the same underlying cause, that is, epistemological and cosmological models within cultures, leads to the observable similarities in perceptions of disease causation and types of therapeutic medicinal plant use between cultures.

The influence of cultural factors in medicinal plant use or non-use and types of uses of plants, is most evident in plant uses which stem from spiritual and cosmological ideas. These types of plant uses seem to cluster within broad cultural areas where peoples may share a set of attitudes about the nature of the world and how it works, and what sorts of practices will be effective on a non-material or spiritual plane.[25] Whether plants are smoked, or used as smudges, or consumed in ceremonial contexts obviously cluster by geographic and cultural areas when one reviews lists of plant uses across cultures.

Another factor which promotes similarity of medicinal plant use between cultures in the same geographic areas are the similarities of flora and of disease causing agents to which people are exposed, which result from the similar environments and ways of life. This suggests that peoples in adjacent cultures may be more likely to choose the same plants in their environment to treat illnesses or injuries to which people in both cultural groups will be exposed. A corollary of this is that the conditions for which medicinal plants are used in species of wide geographic range, or of related species in the same genus, may be very different between cultural groups which occupy very different environments. For example, no Cherokee cough remedies were encountered in the uses of several medicinal plants reviewed to compile Table 8-1, whereas snake bite and diarrheal remedies were encountered. Conversely, no snake bite remedies were encountered in any of the Northwest medicinal uses of plants, because the risk of snake bite is nil except for a few cultures of the arid interior, at the extreme northwest limit of the range of rattlesnakes. No poisonous snakes capable of producing dangerous bites are present over the remainder of the region.

Complexity of Medicinal Plant Use and the Difficulty of Using a Reductionist Framework of Analysis

Traditional medical practices are notoriously complex and difficult to subject to reductionist analysis. The synergistic effects of all of the different ingredients in mixed medications, very frequent in global herbal practice, renders analysis of them enormously complex, or even impossible. Ethnopharmacological work almost always deals with the properties of one plant-or even phytochemical- at a time, in order to limit the complexity of analysis to something that is remotely manageable. This approach is reasonably effective if one's goals are simply the feeding of more raw chemicals into the pharmaceutical industry's drug development pathway, but miss a great deal of the potential healing effect of real medicinal preparations in real humans (themselves complex physiological systems and integrated persons, who may have many factors affecting their overall wellness or illness) with real, and potentially complex, health problems- and in real social contexts. Hence the art of herbalism, healing, and of traditional medical treatment.

Romanucci-Ross *et al.* (1983) do well to remind us, moreover, of the importance of setting (a specifically manipulated type of social context) in the healing process:

> ...perhaps [they speculate] because of the relative lack of powerful specific drugs in the non-Western pharmacopoeia, it is clear that many of these peoples were far more sophisticated and far more inventive than [western practitioners] in manipulating the social and human dimensions of medicine. This aspect of

> non-Western medicine may ultimately have the most to teach us [biomedical practitioners] about healing. Once one recognizes that the *form* of medical treatment affects the *outcome* of treatment, one can hardly leave it to chance, any more than one can prescribe drugs (however effective) by chance.
>
> Human beings are simultaneously biological and cultural organisms. (Romanucci-Ross *et al.*1983:x. underline added, *italics* original)

The complexity of the human being as simultaneously a body/mind/and spirit, with all aspects exhibiting mutual feedback, cannot be ignored either. It is now known, for example, that psychological conditions like depression also have pervasive effects on "physical" wellness, in part through suppression of immune function (Hafen *et al.* 1996: 229-230, and references cited therein) (the hypothalamus, all important in integrating bodily endocrine functions, sits at the base of the brain, and is both a secretory tissue and a nervous tissue). I have already referred to these problems with reference to the difficulties in categorizing uses (see Methodology); but each plant or even phytochemical affects different systems of the human being differently, and the complex resultant of all these vectors is what is empirically manifested for us to observe (for the moment leaving out more esoteric factors). There is interindividual variation (including both physiology and personal history) as well as subtle but important effects of cultural programming of illness perception and experience which influence both the perception and perhaps the course of illness, and the patient's response to therapy, and the patient's evaluation of the effectiveness of the therapy.

The reductionist approach misses much of what is going on because it discards complexity and multiplicity as untidy, unmanageable, and not amenable to analysis. However, to go to the opposite extreme offers little progress in understanding, because complexity can only be represented by itself. In order to elucidate causal factors some sorting must occur so that generalization to take place.

To attempt some middle ground requires both reductionist analysis, and some synthesis of insights produced by different means of examining the problem. One must bring together the disparate pieces which influence one another and reconstitute a whole, albeit a tidier, simpler (and necessarily less complete and accurate) representation or model of the real situation.

SUMMARY AND CONCLUSIONS

I have argued in this chapter that aspects of Gitksan medicinal plant use can be understood as a result of empirical testing of the potential phytochemical and physical properties of healing plants, and their usefulness in treating the illnesses and accidents to which Gitksan people have been exposed. The careful examination of medicinal plant uses of other peoples, primarily other North American indigenous peoples, and of what is known about the phytochemistry, clinical activities, and biological activities supports or suggests that most (70%) of the thirty-seven plants used by the Gitksan are likely to produce effects which would be therapeutic for the purposes for which they use them. In particular, eleven plants are empirically "validated" at Level II or above; seven of these plants are also the most frequently mentioned plants by Gitksan consultants.

Somewhat more problematic is what might be called the negative empirical evidence: the seventy-seven species of plants used as medicine by other peoples but not by the Gitksan, of which 66 were used by more than one other ethnic group. Some of these are used by a number of different ethnic groups over wide areas, and have numerous active chemicals. *Mentha arvensis*, *Arctostaphylos uva-ursi*, *Chimphila umbellata*, *Salix* spp. were dealt with in detail earlier and in Appendix 2. The non-use of *Vaccinium* spp. as medicines is also conspicuous in view of the many active chemicals they contain and the relatively large number of groups which use them elsewhere. I have noted, however, that *Vaccinium* spp. are generally not used as medicine over the whole Northwest Coast area. Whether this is due to a cultural bias, or whether the Northwest species are in general less pharmacologically active than *V. myrtillus*, the species of blueberry for which phytochemical data were available is difficult to say without more data on western species[26]

Although rather problematic for a naive empiricist model of medicinal plant use, the plants not used for medicine provide information about cultural selectivity. Many factors might be responsible for their non-use, ranging from the purely stochastic, to symbolic or contextual. One possible approach to understanding some of this variation would be through use of methods used for elucidating diet breadth in optimal foraging analyses.

My analysis of Gitksan medicinal plant use and healing practice in no way rules out spiritual or moral dimensions of illness, wellness, and healing. However, as biomedicine cannot address such issues, they cannot enter directly into the integration of biomedical understandings with indigenous Gitksan perspectives. They are therefore part of the framing of the biobehavioural analysis, and an important additional realm of analysis in the effort to understand Gitksan healing and the role of medicinal plants.

The Gitksan tend to accord a primacy to a morally based holistic perspective on wellness and illness. They also are attentive observers of their environment and of the outcomes of their behaviours, including therapeutic efforts. Modern Gitksan, like many of us, at present appear to subscribe to multiple (and non-congruent) models of health and the causation of illness and disease (cf. Good *et al.* 1992), invoking different models of causation and therapeutic logic at different times, or even simultaneously. I have referred to the present medical pluralism of Gitksan people previously in Chapter 6. The simultaneous employment of biomedical therapies, including surgery, physiotherapy or chiropractors, antibiotics and other prescription drugs, with faith healing and prayer, or fasting, spiritual vigils, or sweats, use of spiritually potent herbs, various patent medicines, health foods and "alternative therapies", and various supplemental medicinal decoctions or salves, as well as prophylactic use of tonics and consumption of "healthy" foods, represents the spectrum of approaches taken by modern Gitksan people to promote health and combat disease, many times by the same people at the same or different times.

The Gitksan people believe in the fundamental power of their understandings and of their medicinal plants, and are interested in the confirmations that may be offered by pharmacy and biomedicine, by European and Chinese herbology, or the lore of other indigenous peoples. There is also a great deal of interest in alternative therapies of various sorts, especially for troubling and difficult to treat (by biomedicine and traditional medicine) conditions like lupus, cancer, depression, and rheumatoid arthritis.

In the process of conducting a biobehavioural analysis of Gitksan plant use for health promotion and healing, I have reviewed Gitksan plant uses and therapeutic concepts, and made a lengthy digression from anthropology in the usual sense, examining phytochemical and pharmacological studies in attempting to sort out what understandings of biomedicine may bear on Gitksan plant use for therapy and food. After a prolonged process of exposition and analysis, I arrive once again at a holism, which begins with the Gitksan perspective, but is informed by insights from scientific botany and western bioscience.

Table 8-1

Medicinal Plants Used by the Gitksan-Similarity of Uses by Other Groups

Scientific Name	Plant used by other groups	Number	Similar Uses	Number	Use Details
unknown (x̲aadax̲)	yes	1	hunting medicine	1	
			sores	0	
Abies lasiocarpa	yes	7	cleanser	2	
			wounds	4	
			tonic	3	
			resp. (incl TB)	5	
			arthritis	0	
Abies amabilis	yes	3	cleanser	0	
			wounds	2 *	(skin infections; infected eyes)
			tonic	0	
			resp. (incl TB)	2	
			arthritis	1	
Abies grandis	yes	8	cleanser	2	
			wounds	2	
			tonic	2	
			resp. (incl TB)	6	
			arthritis	0	
Abies balsamea	yes	12	cleanser	3	
			wounds	11	
			tonic	1	
			resp. (incl TB)	10	
			arthritis/rheumatism	4	
Achillea millaefolium	yes	53	hairwash	1	
			blood/heart	3	
			sore throat (incl. cough, chest cold)	6	
Alnus crispa/	yes	5	tonics	1	
Alnus viridis	yes	2	gonorrhoea/VD	1	
			cough	1	

Table 8-1
Medicinal Plants Used by the Gitksan-Similarity of Uses by Other Groups

Alnus crispa/A. viridis			physic	1		
Alnus rugosa	yes	5	laxative	1		
Alnus incana and	yes	14		*A.i.*	*A.r.*	
Alnus rubra	yes	10	skin	2	4	
			emetic	2	2	
			headache	0	0	
			unspecified	1	2	(tonic)
Anemone ?lyalli or						
Anemone multifida	yes	4	rheumatism	1		
other spp.	yes	9	sores	1		
Angelica genuflexa	yes	1	no			
Angelica spp.	yes	13	headache	3		(decoction, topical, smoke)
Aralia nudicaulis ? or	yes	6	wound dressing	1		
Actaea rubra ?	yes	15	wound dressing, sores	2		
Aralia hispida, A. racemosa	yes	14	wounds, cuts, boils	3		
Actaea pachypoda	yes	6	no			
Arnica cordifolia	yes	3	no			
Amica spp. & *Heterotheoa inuloides*	yes	4	wounds, bruises, skin	2		
Athyrium filix-femina,	yes	9	boils	1		(sores)
Drypoteris felix-mas , &	yes	3	no			
D. expansa	yes	4	boils	1		(cuts)
Calla palustris	yes	2	no			
Castilleja miniata	no					
C. spp.	yes	10	lame back	1		(rheumatism, paralysis)
			stiff lungs	1		(colds)
			bad eyes	1		(sore eyes)
Cornus stolonifera	yes	23	no			
C. spp.	yes	15	fractures	1		(sprains)
Equisetum arvense, E. hyemal	yes	19	kidney/urinary	11		

Table 8-1
Medicinal Plants Used by the Gitksan-Similarity of Uses by Other Groups

E. pratense, &E. variagatum					
E. sylvaticum, E. telmateia	yes	3	kidney	2	
Geum macrophylum	yes	11	rashes, sores, boils,		
			cuts	5	
other*Geum* spp.	yes	4	? sores, rashes	2?	(oral sores, astringent)
Heracleum lanatum	yes	30	arthritis, swelling	14	
			spiritual	1	(fainting, convulsions; fumigant)
Inonotus obliquus and	yes	4	moxabustion,		
Fomes ignarius			arthritis or pain	2	
Fomes fomentarius	yes	3	moxabustion for arth.	3	
F. officinalis	yes	1	moxabustion for arth.	0	
Juniperus communis &	yes	27		J.c.	J.s.
Juniperus scopulorum	yes	16	smudge	1	2
			respiratory illness	10	5
			tonic	9	3
Juniperus horizontalis	yes	4	smudge	2	
[other species also used]			respiratory illness	2	
			tonic	0	
Ledum groenlandicum	yes	20	heart medicine	3	(Includes blood purifier)
			tonic	4	
			arthritis	3	
Ledum glandulosum	yes	1	heart/blood	1	
			tonic	1	
			arthritis	0	
Ledum palustre	yes	1	no		
Ledum macrophyllum	yes	1	no		
Lobaria pulmonaria	yes	3	no		
Lonicera involucrata	yes	13	eye medicine	2	
Lonicera sp.,*L. canadensis,*	yes	11	no		
L. dioica, L. ciliosa, L. utahensis					

Table 8-1
Medicinal Plants Used by the Gitksan-Similarity of Uses by Other Groups

Lupinus ?nootkatensis	no		no		
L. leucophyllus, L. sericeus, *L. polyphyllus*	yes	2	no		
Malus fusca	yes	11	eye medicine	2	
			tonic	0	
			cough	0	
			rheumatism	0	
			weight gain	1	(poor appetite)
			physic	0	
			diuretic	1	
Nuphar polysepalum (=*N. lutea* ssp *polysepalum*)	yes	10	TB	5	(including chest pain & asthma)
			fractures, arthritis	5	(includes "sickness in bones")
			appetite stimulant	?1	(includes stomach ulcers)
			contraceptive	0	
Nuphar advena and *N. variegatum* (=*lutea* ?)	yes	8	TB	1	(chest medicine)
			fractures, arthritis	3	(arthritis and swellings)
			(poultice) also	1	sores
			appetite stimulant	0	
			contraceptive	0	(1 "allay sexual irritibility")
Oplopanax horridus	yes	33	tonic	6	
			purification,cleanser	4	
			diuretic	?1	(high blood pressure)
			emetic/purgative	7	
			arthritis	13	
			stomach problems	2?	
			TB, colds, respiratory	14	
			wound dressing	5	
			cancer	4	
			diabetes	5	
			laxative	8	
			skin wash/de-scent	4	

Table 8-1
Medicinal Plants Used by the Gitksan-Similarity of Uses by Other Groups

Oplopanax horridus , cont.			fumigant	3				
Picea mariana	yes	6	tonic	2				
			respiratory illness	3				
			pitch for wounds,sores	2				
Picea x lutzii	yes	1		Px	Pi	Pe	Pg	
P. engelmannii	yes	4	tonic	1	0	0	0	
P. sitchensis	yes	6	respiratory illness	1	3	2	2	
P. glauca	yes	7	wounds (pitch)	1	5	2	2	
			burns	0	0	0	0	
Pinus contorta	yes	13	colds and respiratory	8	(incl. TB)			
			wounds, sores, burns	7				
			"sickness"	2	(incl. flu and "weakness")			
Pinus banksiana	yes	3		Pb	Pr	Ps	Pm	Pp
P. resinosa	yes	3	colds, respiratory	1?	1?	11	5	3
P. strobus	yes	12	wounds and sores	2	0	8	2	3
P. monticola	yes	6	"sickness"	0	0	2	1	2
P. ponderosa	yes	7	(incl. grippe, flu, fever, blood tonic)					
(numerous other spp. also used)								
Populus tremuloides	yes	19	purgative, cleanser	1?				
			food, "antiscorbutic"	1				
Populus balsamifera ssp. *trichocarpa"*	yes	11		P.b.t.	P.b.b.	P.c.		
			purgative, cleanser	0	0	0		
P. b. ssp. *balsamifera*	yes	7	food	2	0	0		
Populus candicans	yes	1						
Prunus pensylvanica	yes	6	cough(incl. colds, TB)	5				
			tonic	0				
P. serotina	yes	6		P.s.	P. c&l.	P.a.		
P. cerasus & P. laurocerasus	yes	1	cough	3	1?	0		
P. americana	yes	2	tonic	2	0	0		

Table 8-1
Medicinal Plants Used by the Gitksan-Similarity of Uses by Other Groups

P. nigra				P.n.	P.v.	P.e.
P. virginiana *	yes	26	cough	1	12	4 (incl. TB., cold, sore throat)
P. emarginata	yes	11	tonic	0	7	0
			emetic/purgative	8		
Sambucus racemosa	yes	18	emetic/purgative	3		
Sambucus cerulea	yes	13				
[other species also used]			arthritis	2	(1 use external)	
Shepherdia canadensis	yes	16	induce/speed labour	2		
			possibly related use	6	3	(purgative and laxative)
			cough	3		
			stomach	3		
			sores/boils	2		
			VD	1		
			rheumatism	2	(+1 swellings)	
Smilacina racemosa	yes	20	sore back	2		
			purgative	1	(laxative)	
			kidney ailments	1		
			wound treatment	2		
Sorbus scopulina &	yes	9	tonic	1		
S. sitchensis			respiratory illness	3	(+1 fever)	
			physic (fruits)	0	(1 labour aid)	
Sorbus americana	yes	8	tonic	3		
			respiratory illness	2		
			physic	2		
Thalictrum occidentale	no			T. da	T.di.	T.f
T. dasycarpum	yes	3	headache	0	0	0
T. dioicum	yes	2	eye trouble	0	1	0
T. fendleri	yes	3	sore legs	0	0	0
T. polycarpum	yes	3		T. p.	T.sp.	T.t.
Thalictrum sp.	yes	1	headache	1	0	0

Table 8-1
Medicinal Plants Used by the Gitksan-Similarity of Uses by Other Groups

T. thalictroides	yes	1	eye trouble	0	0	0	
			sore legs (inc.sprains)	1	0	0	
Tsuga heterophylla	yes	12	swallowed sharp objec	1	(Nisga'a; not independant)		
			gall bladder, liver tone	0			
Valeriana sitchensis	yes	3	protective amulet/ deodorizer	1?	(hunting medicine)		
V. dioica	yes	3	protective amulet/ deodorizer	1?	(hunting medicine)		
Veratrum viride	yes	20	boils & swellings	3			
			skin ailments	5	(incl. dandruff & hair restorer)		
			fumigant	2			
			protective charm	4			
			spiritual cleanser	2	(power plant for hunting)		
			aches, pains, lame places (topical)	7			
			lung hemorrhage, topicε	0			
Veratrum californicum	yes	5	boils & swellings	2			
			skin ailments	4			
			fumigant	0			
			protective charm	0			
			spiritual cleanser	0			
			aches, pains, lame places (topical)	5			
			lung hemorrhage, topicε	0			
Viburnum edule	yes	5	cough	4			
			headache, weak eyes	0			
V. acerifolium	yes	4		V.ac.	V. al.	V. l.	V. t.
V. alnifolium	yes	2	headache, weak eyes	0	1	0	1
V. lentago	yes	5	cough	0	1	1	0
V. trilobum	yes	3					

TABLE 2-2
GITKSAN MEDICINAL PLANTS-PHYTOCHEMICALS

Latin name(s)	English name	Constituents	References
Abies lasiocarpa (A. balsamea ssp. *lasioca*	subalpine fir, 'balsam'	entire plant: sesquiterpene: lasiocarpenone	Fraser & Swan 1975
A. balsamea ssp. *balsamea*		bark- quercetin, tannins	Arnason et al 1981
		bark- steroids: minor amounts of campesterol & β-sitosterol	Chandler & Hooper 1982
		needles-steroids: minor amounts of stigmasterol & β-sitosterol	
		bark-triterpenoids:alpha-amyrin, β-amyrin; minor allobetulin and betulin	
		bark-tannins & polyphenols: high levels of progallol type	
		plant-bornyl acetate 950-2045 ppm; limonene 720-1550 ppm; camphene 440-950 ppm, a-pinene 545-5050 ppm, abieslactone, etc.	Beckstrom-Sternberg & Duke 1994
Achillea millaefolium	yarrow	Active chemicals include: achilleine, achillin, α-pinene, α-terpinene, apigium, azulene, β-pinene, π-sitosterol, betaine, betonicine, borneol, bornyl-acetate, butyric acid, caffeic acid, camphene, camphor, caryophyllene, choline, cuminaldehyde, ducitol, eugenol, formic acid, furfural, guaiazulene, inositol, isorhamnetin, limonene, luteolin, mannitol, menthol, myrcene, oleic-acid, p-cymene, palmitic acid, ponticaepoxide, quercetin, quercitrin, rutin, salcylic acid, stachydrine stigmasterol, succinic-acid, tannins, trigonelline.	Beckstrom-Sternberg & Duke 1994
		Also vitamins: ascorbic acid, riboflavin, thiamin, folicin	
Alnus crispa ssp. *sinuata* (=*A. viridis* ssp. *crispa)*	alder, 'mountain'	bark-triterpenes: α and β-amyrin, betulin, lupeol, minor sterols	Hooper & Chandler 1984
		buds-flavonoids: ayanin, 3'-4'-5-hydroxy-3-7-dimethoxy flavone, 4'-5-dihydroxy-3-7-dimethoxy flavone, genkwanin	Wollenweber 1975
A. viridis		buds-flavonoid: quercetin	Wollenweber 1975
Alnus incana	alder	buds-flavonoids: betuletol, 5-7-dihydroxy-4'-6-dimethoxy flavone, mikanin, quercetin, iso-rhamnetin, and 4'-6-7-trimethyl-pectolinari-genin scutellarein	Wollenweber 1975
A. rubra		bk-triterpenes: betulin & lupeol; sterols: β-sitosterol	Sheth et al 1973
		benzenoid: oregonin	Hrutford & Luthi 1981
		buds-flavonoids: acacetin, apigenin, betuletol, kaempferide, 5-7-dihydroxy-4'-6-dimethoxy flavone, iso-rhamnetin	Wollenweber 1975
Anemone ?lyallii or ?multifida		protoanemonin	
Angelica genuflexa	angelica	no reports of constituents	
Angelica archangelica		Roots-essential oil (1%)containing phellandrene, organic acids, and a coumarin, angelicin	Schauenberg & Paris 1977
Angelica sylvestris		All parts : an essential oil and coumarin	Schauenberg & Paris 1977
Aralia nudicaulis &/or	'bear's berries'- wild sarsaparilla	"roots" (rhizomes?) moderately high β-sitosterol, moderate stigmasterol, unidentified lipids, campesterol; stems, lvs, rhizomes-moderate levels of triterpenoids, including α and β-amyrin, and others	Hooper & Chandler 1984
		alkaloids	Maries 1984
Actaea rubra	or baneberry	berries & roots-protoanemonin	
Arnica cordifolia	heart leaved arnica		
Arnica montana (European)		Plant-essential oil of 2 triterpenic alcohols, arnidiol and faradiol; flavonoids: kempferol and quercetol	Schauenberg & Paris 1977
Athyrium filix femina,	'inedible fern root'	no reports of constituents	

TABLE 2-2
GITKSAN MEDICINAL PLANTS-PHYTOCHEMICALS

Drypteris felix-mas		aspidinol, albaspidine, phloraspine, filicinic acid	Schauenberg & Paris 1977
D. expansa		no reported non-nutritive constituents	
Calla palustris	wild calla or water arum	abundant calcium oxylate	Kingsbury 1964
		"poisonous acids and burning saponin-like substances, all of which, however, are neutralized by drying or boiling."	Hultén 1968
Castilleja miniata	Indian paintbrush	positive test for presence of alkaloids	Hamon et al 1981
Cornus stolonifera	red osier dogwood	stem bark-alkanes (C:24-C:26), fumaric acid, and flavonoid: hyperin	Nair & Von Rudolff 1960
Cornus florida		ursolic acid	Beckstrom-Sternberg & Duke 1994
Equisetum arvense	horsetails and scouring rushes	Glycosides: Isoquercitrin, luteolin, kaempferol;	Schauenberg & Paris 1977
Equisetum arvense , cont.		Saponoside: equisetonin; Alkaloid: trace of nicotine. Silica.	
		β-sitosterol, caffeic acid, hihydroquercetin, ferulic acid, naringenin, oxalic acid, *p* -hydrobenzoic acid. Also vitamins: ascorbic acid, β-carotene, niacin, thiamin. Antinutrient: thiaminase	Beckstrom-Sternberg & Duke 1994
E. hyemale		caffeic acid, ferulic acid	Beckstrom-Sternberg & Duke 1994
E. variegatum,		no reports	
Equisetum pratense	horsetail, meadow	no reports	
Geum macrophyllum		no reports	
Geum rivale		Rts: glycoside yielding eugenol on hydrolysis; plant-tannin, bitter cor	Schauenberg & Paris 1977
Geum urbanum		Same as *G. rivale* , but has higher tannin content.	Schauenberg & Paris 1977
Heracleum lanatum	cow parsnip, 'wild rhubarb'	all parts-furanocoumarins	Berenbaum 1981, El-Dakhaknny&Steck 1970, Puthak et al 1962
		roots-lignans	Nakata et al 1962
H. laciniatum		roots: angelicin, bergaptin, isobergaptin, isopimpinellin, pimpinellin, sphondin	Beckstrom-Sternberg & Duke 1994
Inonotus obliquus and *Fomes ignarius*	'birch fungus'		
Juniperus communis	juniper	tannins, alpha pinene, camphor	Arnason et al 1981
		flavonoids, benzenoids, lignans, alkenes, diterpenpolyprenoids, malic acid, oxalic acid, phenyl pyruvic acid, aconitic acid, tartaric acid, vanillic acid, ascorbic acid	De Pascual et al 1980; Lamer-Zarawaka 1977, Linder & Grill 1978, Beckstrom-Sterbernberg & Duke 1994
		whole plant-steroids: relatively high β-sitosterol,	Hooper & Chandler 1984
		whole plant except gr. berries-minor campesterol & stigmasterol	
		berries: 2% volatile oil, 33% sugar, 9% resin, tannin, flavone glycoside	Claus et al 1970
		juniper oil: 50% alcohols 1-terpinen-4-ol., alpha-pinene, camphene, and cadinene	
Ledum groenlandicum	Labrador tea	contains small amounts of andromedotoxin, ledol& narcotic substance	Johnson et al 1995
		borneal, carvacrol	Arnason et al 1981
Lobaria pulmonaria and *L.oregana*	lungwort, 'frog blankets'	no reports found	
Lonicera involucrata	black twinberry	no reports found	
Lonicera (genus)		monodesmoside saponins	Bisset 1991
Lupinus arcticus	'carrots' ?		
Malus fuscus	Pacific crabapple	no reports on chemistry of *Malus* bark	
Nuphar polysepalum	pond lily, yellow	?stigmasterol	•source??
Nuphar advena		tannins	Arnason et al 1981
		minor triterpenoids	Hooper & Chandler 1984

TABLE 2-2
GITKSAN MEDICINAL PLANTS-PHYTOCHEMICALS

Nymphaea odorata		tannins & polyprenoids: gallic acid & ellagic acid	Arnason et al 1981
		steroids: relatively high β-sitosterol, minor campesterol & stigmasterol, rel. high unident. lipids	Hooper & Chandler 1984
Nuphar variegatum		alkaloids present; deoxynuparidine, nupheine	Marles 1984; Gibbs 1974 in Marles '84
Nuphar lutea	yellow water-lily	Sesquiterpene alkaloids: nupharine, thibinupharidine, desoxynupharidi	Schauenberg & Paris 1977
Oplopanax horridus	devil's club	inner bk-triterpenoids: opladiol, (-)-4α, 7β-aromadendramediol 3,10,11-trihydroxy-3,7,11-trimethoxy11,6 dodecadiene; (-)-adenosine,adenine	Feng, n.d.
P. x lutzii -P. engelmanii	spruce	bark-benzenoids: astringin,' iso-rhapontin	Pearson et al 1979
P. glauca		tannins	Arnason et al 1981
P. mariana	black spruce	tannins, catechin	Arnason et al 1981
		bark-steroids: monor amounts of campesterol, stigmasterol, β-sitosterol, unidentified lipids	Hooper & Chandler 1984
Pinus contorta	pine, lodgepole	bark-flavonoids: myrcetin, quercetin, dihydroquercetin	Vercruysse et al 1985
		bark, oleoresins- monoterpenes: camphene, car-3-ene, limonene, myrcene, β-phellandrine, alpha-pinene, β-pinene, sabinene, terpinolene	Mannings & Hemmingson 1975
		needles-flavonoids: quercetin, kaempferol, iso-rhamnetin	Higuchi & Donelly 1977
Pinus sylvestris	pine, Scotch	lignans, resins, terpenes, waxes, steroids	Airaksinen et al 1986
Populus tremuloides	aspen, trembling	salicin, *o* -pyrocatechol	Arnason et al 1981
Populus balsamifera		salicortin	Beckstrom-Sternberg & Duke 1994
Prunus pensylvanica	pincherry	cyanogenic glycosides (lower levels than P.serotina)	Kingsbury 1964
		bk&lvs-β-sitosterol(mod. levels); bk. high levels of catechol type po	Hooper & Chandler 1984
		phenols	Chandler & Hooper 1982
P. serotina		cyanogenetic glycoside: prunlaurasin (related to amygdalin)	Kingsbury 1964
P. virginiana		cyanogenetic glycoside: prunasin (related to amygdalin)	Kingsbury 1964
Sambucus racemosa	red elderberry	Choline; triterpenoid: ursolic acid	Yardin 1936; Borokov & Belova 1967
Shepherdia canadensis	soapberry	saponins	Turner 1981
Family Eleagnaceae		Strongly tanniferous with ellagic acid, and often proanthocyanins, frequently quebrachitol. Indole alkaloids possible	Cronquist 1983?
Smilacina racemosa	Solomon's Seal, false	tannins, azetidine-2-COOH	Arnason et al 1981
Sorbus sitchensis and *S. acopulina*	mountain ash	no reports on chemistry of *Sorbus acopulina* or *sitchensis* bark	Hooper & Chandler 1984
Sorbus americana (Eastern North America)		Stem bk. and twigs-moderately high triterpenoids: α-amyrin, betulin, and others; lvs-more α-amyrin. Sterols: bark-low levels of β-sitosterol; kvs.-campesterol and β-sitosterol present. Tannins& polyphenols: bark-high levels of catechol type present. Flavonoids: bk, present.	Chandler & Hooper 1982
S. acuparia (European)	rowan, mountain ash	bark-tannins	Beckstrom-Sternberg & Duke 1994
		bark-amygdalin	Grieve 1931
		fruits-amygdalin, ascorbic acid, asozone, caffeic acid, calcium, chlorogenic acid, cinnamic acid, citric acid, cryptoxanthin, epicathechin epicathechin-gallate, gallic acid, isochlorogenic acid, isoquercitrin, malic acid, neochlorogenic acid, *p* -coumaric acid, parasorbic acid, parasorboside, pectin, phloroglucinol, protocatechuic acid, quercetin, quinic acid, rutin, sorbic acid, sorbitol, succinic acid,	Beckstrom-Sternberg & Duke 1994

TABLE 2-2
GITKSAN MEDICINAL PLANTS-PHYTOCHEMICALS

		tannins, tartaric acid, tocopherol, ursolic acid.	
Tsuga heterophylla	hemlock, western	no reports	
T. canadensis	hemlock, eastern	tannins, kaempferol, α& ß-pinene, α-terpinol, bornyl acetate, limonene	Arnason et al 1981
		α-phellendrene, ascorbic acid	
Veratrum viride	Indian or False hellebore	diverse glycoalkaloids & ester alkaloids with alkamines of steroidal	Jeger & Prelog 1960, Kingsbury 1964
		configuration including veratrosine (alkamine forme veratramine)	Kingsbury 1964
		roots-germbudine, germidine, germine, isogermidine, neogermitrine	Beckstrom-Stemberg & Duke 1994
		jervine, rubijervine, veratrine	
		rhizomes- acetic acid, 1-α-hydroxy-α-methylbutyric acid,	Beckstrom-Stemberg & Duke 1994
		1-α-methylbutyric acid, deacetyl proveratrine, isorubijervine,	
		neogermidine, pseudojervine, veratralbine	
Viburnum edule	highbush cranberry	No reports found	
V. prunifolium		Amentoflavones, scopoletin, ß-sitosterol, aesculentin, α& ß amyrin,	
		oleanic acid,ursolic acid, arbutin	
V. opulus		scopoletin, ß-sitosterol, aesculentin, α & ß amyrin, oleanic acid	
		ursolic acid, arbutin, *dl*-catechin	
V. cassinoides		ß-sitosterol, minor campesterol & stigmasterol, unidentified lipids	Hooper & Chandler 1984
		alkaloids, high levels of catechol type tannins & polyphenols	Chandler & Hooper 1982

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

Latin name(s)	English name	Bioassays, Clinical properties and Probable Activities	References
Abies lasiocarpa	subalpine fir, 'balsan	Bioassays: (pitch) moderate inhibition against Staphylococcus aureus; no inhibition against E. coli or Pseudomonas aeriginosa	Ritch-Krc *et al.* 1996
		Probable activities-antiviral: quercetin-parainfluenza 3 virus, Aujeszky virus, pseudorabies virus, herpes simplex, herpes hominis, herpes suis, polio virus in vitro; Mengo virus, encephalomyocarditis virus, & others (in vivo, mice)	Che 1991
		quercitin: 5-lipoxygenase-inhibitor, aldose-reductase inhibitor, allelochemic, anti-tumor promotor, antiCrohn's, antiPMS, antiaggregant, antiallergic, antianaphylactic, antiasthmatic, anticataract, anticilitic, antidermatitic, antidiabetic, antiestrogenic, antifeedant, antigastric, antihepatotoxic, antihistamine, antiinifammatory, antileukotrienic, antilipoperoxidant, antioxidant, anti-periodontal & plaque, antipermeability, antipharyngitic, antipodriac, antipsoriac, antiradicular, antitumor, bactericide, cancer-preventative, capillariprotective, clyclooxygenase-inhibitor, cytotoxic, HIV-RT-inhibitor, hypoglycemic, insulinogenic, lipoxygenase-inhibitor, mast-cell-stabilizer, mutagenic, pesticide, spasmolytic, teratologic, tumorigenic, vasodilator, xanthine-oxidase-inhibitor, cyclic AMP-phosphodiesterase-inhibitor.	Beckstrom-Sternberg and Duke 1994
Abies balsamea		Probable activities: bornyl acetate antiviral & viricide, bactericide, pesticide, spasmolytic; limonene, camphene, α-pinene-see Juniperus communis	
Abies holophylla and *A. nephrolepis* (Siberian species)		Bioassays-antibacterial: moderate to strong activity Staphylococcus aureus, Bacilus subtilis, E coli & E "crim" 2584,Shigella sonnei & Sh. flexneri (*A. h.* lvs, bk & (*A.n.* lvs; *A.n.* bk weak)	Moskalenko 1986
Achillea millaefolium	yarrow	Probable activities: Many active chemicals; see above for quercetin, bornyl acetate; see below for β-sitosterol, α-pinene, limonene, apigenin. Potential Activity Summary: antiseptic, antibacterial, anti-viral, antifungal properties; hypotensive, antithrombotic, cardiotonic, strengthens capillaries; anticancer &antitumour; antihistaminic, antiinflammatory, antirheumatologic, anti asthmatic, antiallergic; expectorant and counterirritant; analgesic; antinephritic and liver toning; antidiabetic, anti-	

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

Achillea millaefolium, cont.		colitic, and spasmolytic. Toxic: abortifacient, anemiagenic, spasmogenic, paralytic, tumorigenic, phototoxic, cerebro depressant, convulsant, epileptigenic, hallucinogenic, & respirainhibitory [CNS effects due to thujone] Caffeic acid: analgesic, is antiviral against flu & herpes, antiseptic, bactericidal, anti-tumor promoter and cancer-preventative but tumorigenic, liver protecting and hepatotropic, cholerectic, is a fungicide,histamine-inhibitor, leukotriene inhibitor, lipoxygenase inhibitor, pesticide, spasmolytic, and vulnerary. Camphene: spasmogenic. Camphor:abortifacient, allelopathic, analgesic, anesthetic, antifibrositic, antineuralgic, antipruritic, antiseptic, CNS-stimulant, cancer-preventative, carminative, convulsant, counterirritant, deleriant, ecbolic, emetic, expectorant, respirainhibitor, rubifacient, spasmolytic. Luteolin: aldose-reductase inhibitor, antihistaminic, antiinflammatory, antioxidant, antitussive, cancer-preventative, cholerectic, diuretic, pesticide, spasmolytic, xanthine-oxidase inhibitor. Myrcene: analgesic, antimutagenic, antinociceptive, bactericide, pesticide, spasmolytic. Quercitrin: aldose-reductase inhibitor, antiarhythmic, anticataract, antiinflammatory, antiviral & viricide, CNS-depressant, cancer-preventative, cardiotonic cholerectid, detoxicant, diuretic, hepatotonic, hypotensive, paralytic, pesticide, spasmolytic, vasopressor. Salcylic acid: analgesic, antidermatotic, antiinflammatory, antioxidant, antiperiodic, antipodagric, antipsoriac, febrifuge, antirheumatic, antiseborrheic, antiseptic, bactericide, cancer-preventative, fungicide, ulcerogenic.	
		Bioassays: antibacterial activity-moderate levels of activity E-coli, Mycobacter phlei, and methicillin resistant Staphylococcus aureus, weak activity against susceptible S. aureus and Salmonella typhimurium.	McCutcheon et al 1992
		Moderate levels of activity against all species surveyed; weakest against Staphylococcus aureus.	Moskalenko1986
Alnus crispa (*A. viridis* ssp. *crispa*)	alder, 'mountain'	Probable activities: bark-betulin: antitumor, cytotoxic; α-amyrin: antitumor, cytotoxic; lupeol: antitumor, antiurethrotic,cytotoxic; buds-genkwanin: bactericide, pesticide, purgative	Beckstrom-Stemberg & Duke 1994
A. viridis		quercetin-parainfluenza 3 virus, Aujeszky virus, pseudorabies virus, herpes simples, herpes hominis,	Che 1991

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

A. viridis , cont.		herpes suis, polio virus in vitro; Mengo virus, encephalomyocarditis virus, & others (in vivo, mice)	
		quercetin-other properties, see under Abies balsamea	Beckstrom-Sternberg & Duke 1994
Alnus incana	alder	Probable activities: quercetin see above & Abies balsamea isorhamnetin: antihistaminic, antiinflammatory, antioxidant, bactericide, cancer-preventative, liver protecting, pesticide, spasmolytic; scutellarein: anti-hemolytic, aldose-reductase inhibitor, cancer preventative, phospholipase-A2-inhibitor	Beckstrom-Sternberg & Duke 1994
		Bioassay: anti-cancer activity	Ritch-Krc et al. 1996
Alnus rubra		Probable activities: acacetin has antiallergic properties apigenin is antiallergic, antarhythmic,antiestrogenic, antihistaminic, antiiflammatory, antimutagenic, antioxidant bacteridical, cancer-preventative, cholorectic, diuretic, hypotensive, muscle relaxant, pesticide, sedative, spasmolytic, and vasodilator; iso-rhamnetin-see above	Beckstrom-Sternberg & Duke 1994
		Bioassays: antibacterial activity-bark & catkins: moderate to strong against Bacillus subtilis, E. coli, Mycobacter phlei, Pseudomonas aeriginosa, Staphylococcus aureum, Salmonella typhimurium; strongest against Mycobacter phlei	McCutcheon et al 1992
		catkins-antifungal activity	McCutcheon et al 1994
		CHCL3 extract-antitumour activity (in vivo, rat)	Sheth et al 1973
other alder spp. *A. glutinosa* (Eastern US and Europe)		Bioassays: fresh catkins or fruits, twigs with buds and lvs.-antibacterial activity, Mycobacterium tuberculosis (in vitro)	Frisbey et al 1953
		dr. fruits-antitrichomonal activity (in vitro)	Racz et al 1980
A. nitida (India)		Bioassay: antiviral activity in vitro	Omar et al 1973
A. nepalensis (India)		Bioassay: hypoglycemic and antispasmodic activity	Omar etal 1968
A. arguta, A firmifolia, A. oblongifolia (N. Am)		Bioassay: tumor promoting effects	Caldwell & Brewer 1983
A. hirsuta & *A. maximoviczii*		Bioassay: moderate to strong antibacterial activity against al species tested (fls.); wk against all sp.(lvs.)	Moskalenko 1986
Anemone ?lyallii		No reports found.	
Angelica genuflexa	angelica	Clinical: tonic, carminative, stomachic, antispasmodic.	Schauenberg & Paris 1977
Angelica archangelica		Probable activities: angelicin phototoxic, antiviral -active against influenza virus type A (in vitro); see Heracleum laciniatum for other activities of angelicin.	Che 1991
Angelica sylvestris		Clinical: stomachic.	Schauenberg & Paris 1977
Actaea rubra		Clinical: protoanemonin-toxic; poisoning symptoms-vomiting bloody diarrhea, paralysis of respiration-but no reports of fatal poisoning of humans or livestock from *A. rubra* in US	Kingsbury 1964
		Probable activities: protoanemonin-antibiotic, antileukemic,	Beckstrom-Sternberg & Duke 1994

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

Actaea rubra , cont.		antimutagenic, antiseptic & bactericidal, antiviral & active against Candida (yeast), fungicide, irritant, nephrotoxic, purgative, vermifuge, pesticide.	
A. spicata (European species)		Clinical (herbology) antispasmodic	Grieve 1931
		(homeopathy) for articular rheumatism of hands & feet & for "particular female ailments"	Schauenberg & Paris 1977
Aralia nudicaulis	'bear's berries'	Possible activities-alkaloids; same family as Ginseng.	Marles 1984
Arnica cordifolia	heart-leaved arnica	No clinical reports or reports of activity for this species.	
Arnica spp.		Clinical: listed as poisonous and not for internal use.	Johnson et al 1995
		Clinical: listed as antiseptic externally, and causing a rise in body temperature when taken internally.	Pojar & McKinnon 1994
Arnica montana		Clinical: stimulates circulation, hypertensive, uterotonic, is "antiphlogistic" causing resorption of internal bleeding in cellulitis and apoplexy. Used in homeopathy.	Schauenberg & Paris 1977
Athyrium filix femina,	'inedible fern root'	No reports of activity	
Drypteris felix-mas,		Clinical: antihelminthic; acts on tapeworms by paralysing but not killing them. Toxic and "must be evacuated from the body within 2 hours of taking it"	Schauenberg & Paris 1977
		Bioassay: antiviral against visicular stomatitis virus, herpes simplex and h.s.type 1, and influenza virus type A	Che 1991
Dryopteris expansa		No reports of activities found.	
D. fragilis (Siberian)		very strong anibiotic activity against all species tested	Moskalenko 1986
D. crassirhizoma (Siberian)		moderate atibacterial activity against all species tested	Moskalenko 1986
Calla palustris	wild calla	Clinical: toxic if underprocessed-severe swelling of oral & pharynx	Kingsbury 1964
Castilleja miniata	Indian paintbrush	No reports of activity	
Cornus stolonifera	red osier dogwood	Bioassays: antibacterial activity-low level of inhibition of Mycobacter phlei	McCutcheon et al 1992
		Probable activities: fumaric acid has antitumor and antioxidant properties and protects against liver cancer	Beckstrom-Sternberg & Duke 1994
		Hyperin is antiinflammatory, antioxidant, antitussive, antiviral, pesticidal, fortifies capillaries, and induces capillary formation	Beckstrom-Sternberg & Duke 1994
Equisetum arvense	horsetails	Clinical: (herbology) diuretic and mineral supplement for TB (homeopathy) cystitus, anuresis, pulmonary TB	Schauenberg & Paris 1977
		Probable activities: antiviral-luteolin active against herpes simplex & other types , polio virus & pseudorabies virus kaempferol, naringenin, oxalic acid, *p* -hydrobenzoic acid: diuretic, bactericidal, fungicidal, antiinflammatory, anti-antihistaminic. Nicotine-effects autonomic nervous system	Che 1991

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

E. hyemale & E. arvense	horsetail scouring rush	Ferulic acid: antiviral, bactericidal, fungicidal, anti-cancer, spasmolytic; caffeic acid see above, Achillaea similar to ferulic acid; also histamine inhibitor.	
		Bioassays: no antibacterial activity against any tested strains (ethanol and methanol extracts)	McCutcheon et al 1992 Moskalenko 1986
		Bioassay: anticancer activity-damage to sarcoma tissue (in vivo, mice, weak activity)	Belkin et al 1952
Equisetum pratense	horsetail, meadow	not reported	
Geum macrophyllum		Bioassay: strong antifungal activity, 9 spp. (roots)	McCutcheon et al 1994
Geum rivale (European)		Clinical: stomachic, tonic, astringent, antidiarrhoeic	Schauenberg & Paris 1977
Geum urbanum (European)		Clinical: astringent, bitter, tonic.	Schauenberg & Paris 1977
G. aleppicum		Bioassay: no anticacterial activity against any species tested	Moskalenko 1986
Heracleum lanatum	cow parsnip	Clinical Properties:Furanocoumarins damage DNA in presence of UV radiation, causing blistering of skin	Camm et al 1976
		Bioassays: Antibacterial activity (aerial parts)- Mycobacter phlei, Pseudomonas aeriginosa, Staphylococcus aureus, Salmonella typhimurium roots (weak activity) Bacillus subtilis, Staphyloccocus aureus, (stronger activity) E coli, Mycobacter phlei Salmonella typhimurium	McCutcheon et al 1992
		antifungal activity against 9 spp. of fungi (roots)	McCutcheon et al. 1994
Heracleum laciniatum		Probable activities: Antiviral activity-angelicin is photoactive and active against influenza type A virus	Che 1991
		angelicin: anticonvulsant, CNS depressant, hypotensive, phototoxic, sedative, spasmolytic	Beckstrom-Sternberg & Duke1994
		isopimpinellin: supresses appetite, antiinflammatory, antitubercular, calcium-antagonist, diuretic, insecticide, molluscicide, mutagenic, pesticide	
		bergaptin:"antiaperitif", anticunvulsant, antihistaminic, antiinflammatory, anti-psoriac, antitumor, DME-inhibitor, hypotensive, insectiside, molluscicide, pesticide, spasmolytic	
		pimpinellin: diuretic	
Inonotus obliquus and *Fomes ignarius*	'birch fungus'	*I. obl.* antibacterial	Moskalenko 1986
Juniperus communis	juniper	Clinical: diuretic	
		Bioassays: antitumor and antiviral in vitro	Belkin et al 1952, Che 1991
		embryotoxic (in vivo, rats)	Agrawal et al 1980 May & Willuhn 1978, & others
		Antibacterial activity: moderate inhibition, Bacillus	McCutcheon et al 1992

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

Juniperus communis , cont.		subtilis, E coli, Mycobacter phlei, Pseudomonas aeriginosa, Staphylococcus aureua, Salmonella typhimurium Potential activities: limonene-acetylcholinesterase inhibitor; anti-Alzheimerian?, anticancer, antilithic, antiviral & viricide, bactericide, cancer-preventative, irritant, sedative, spasmolytic; camphene: spasmogenic; α-pinene: antiinflammatory, cancer preventative; borneol-analgesic, antiinflammatory, febrifuge, liver-protecting, spasmolytic; myrcene: analgesic, antimutagenic antinociceptive, bactericide, spasmolytic; umbelliferone- antihistaminic, antiseptic, cancer-preventative, choleretic,fungicide, lipoxygenase inhibitor; ursolic acid:see Sambucus camphor: abortifacient, analgesic, anesthetic, antifibrositic antineuralgic, antipruritic, antiseptic, CNS-stimulant, cancer preventative, carminative, convulsant, counterirritant , delerieant, ecbolic, emetic, expectorant, respirainhibitor, rubifacient, spasmolytic, stimulant(present in small amounts)	
Ledum groenlandicum	Labrador tea	Potential activities: toxicity due to andromedotoxin or ledol andromedotoxin-headaches, cramps, indigestion; ledol-cramps and paralysis in large doses	Kingsbury 1964
L. macrophyllum (Siberian)		moderately strong to strong antibacterial activity against all species tested, especially Staphylococcus aureus	Moskalenko 1986
Lobaria pulmonaria and *L.oregana*	lungwort	No reports of bioassays or activities found.	
Lonicera involucrata	black twinberry	Bioassays: no observed antibacterial properties	McCutcheon et al 1992
L. mackii, L maximowiczii (Siberian spp.)		Bioassay: frut & lvs-significant antibacterial activity bark-weak (*L. Mackii*) to no (*L. maximowiczii*) activity	Moskalenko 1986
Lonicera (genus)		Probable activity: monodesmoside saponins-molluscicidal	Bisset 1991
Lupinus arcticus	'carrots' ?		
Malus fuscus	Pacific crabapple	No reports of bioassays or activities found.	
Malus mandshurica (Siberian species)		Bioassay: antibacterial activity-leaves: weak to moderate activity against all species surveyed.	Moskalenko 1986
Nuphar polysepalum	pond lily, yellow	Bioassays: moderate to strong antibacterial activity against Bacillus subtilis, E coli, Mycobacter phlei, Pseudomonas aeriginosa, Staphylococcus aureus	McCutcheon et al 1992
Nuphar spp. & *Nymphaea odorata*		Probable activities:	
		gallic acid shows antviral activity in vitro	Che 1991
		also has anticarcinomic, antifibrinolytic, antioxidant, antiseptic, astringent, bacteriostatic, hemostatic, & styptic properties. Also reported to be cancer preventative, but carcinogenic (!), nephrotoxic, a xanthine-	Beckstrom-Sternberg & Duke 1994

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

Nuphar spp. & *Nymphaea odorata* , cont.		oxidase inhibitor, and pesticide	
		β-sitosterol causes infertility in male rats (in vivo)	Ghannudi et al, 1978, Malini 1987, Malini & Vanithkumari 1991
		β-sitosterol also effects fertility in female rabbits.(in vivo)	Burck et al 1982
		β-sitosterol is androgenic, anorexic, antiadenomic, antiandrogenic, antiestrogenic, antigonadotrophic, antiinflammatory, antileukemic, antimutagenic, antiprogestational, antiprostatademonic, antiprostatitic, antitumor, antiviral, bactericidal, active against Candida, cancer-preventative, estrogenic, gonadatrophic, hypocholesterolemic, hypoglycemic, hypolipidemic, a pesticide, and a spermicide	Beckstrom-Sternberg & Duke 1994
Nuphar lutea		Clinical: alkaloids are hypotensive and antispasmodic. In hompathy used to treat impotence and diarrhea.	Schauenberg & Paris 1977
Oplopanax horridus	devil's club	Clinical: hypoglycaemic properties	Brocklesby & Large 1938, Justice 1966 but see Smith 1983
		Bioassays: inhibition of insulin degradation (in vitro) but no activity in vivo (rats)	Williams et al 1989
		antibacterial activity: Mycobacter phlei (strong inhib.) Staphylococcus aureus (strong inhib. of methicillin sensitive strain), Salmonella typhimurium	McCutcheon et al 1992
Oplopanax horridus , cont.		antiviral activity: partial inhibition, respiratory syncytial virus	McCutcheon et al 1995
P. x lutzii *	spruce	No reports found.	
Picea engelmanii		Probable activities: astringin-fungicide, pesticide	Beckstrom-Sternberg & Duke 1994
P. glauca	white spruce	Bioassay: (pitch) anti-microbial	Ritch-Krc et al 1996
P. mariana	black spruce	No reports found	
Picea abies (European)		Bioassays: essential oil from young shoots-antibacterial activity: Staphyloccocus aureus, Streptococcus faecalis, Bacillus subtilis, β hemolysing Strept.A, S. pneumoniae, S. milleri, Staphylococcus strains, Corynebacterium diphtheriae Anti-yeast activity: Candida albicans	Kartnig et al 1991
Pinus contorta	pine, lodgepole	Bioassays-antibacterial activity: moderate inhibition Bacillus subtilis, E Coli, Mycobacter phlei, Pseudomonas aeriginosa, Staphylococcus aureus, Salmonella typhymurium;	McCutcheon et al 1992
P. ajannensis, P. koraiensis, P. pumilis		antimicrobial (pitch) antibacterial activity (gram+, -) Staphylococcus aureus, Bacillus subtilis, E coli, E "crim" 2584, Mycobacter smegmatis, Shigella sonnei, Sh. glexneri	Ritch-Krc et al 1996
Pinus contorta		Probable activities: antiviral:-a-pinene& limonene	Che 1991

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

Pinus contorta, cont.		influenza A and B virus in vitro quercetin-parainfluenza 3 virus, Aujeszky virus, pseudorabies virus, herpes simplex, herpes hominis, herpes suis, polio virus in vitro; Mengo virus, encephalomyocarditis virus, & others (in vivo, mice) other properties, see Abies balsamea	
Populus tremuloides	aspen, trembling	Bioassay: bark-weak antibacterial activity against Mycobacter phlei & E-Coli	McCutcheon et al 1992
		Probable activities: salicin has anti-viral activity against polio virus in vitro. Salicin is analgesic, antiaggregant, anti-inflammatory, antineuralgic, antiperiodic, antipodagric, anti-rheumatic, pesticide, sedative, stomachic, teratogenic, tonic, and uterorelaxant.	Che 1994 Beckstrom-Sternberg & Duke 1994
Populus balsamifera		Probable activity: Salicortin is analgesic.	Beckstrom-Sternberg & Duke 1994
Populus maximoviczii (Siberian species)		Bioassay: leaves or bark-moderate to strong antibacterial activity against Staphylococcus aureus, Bacillus subtilis, E. coli, E "crim" 2584, Mycobacter smegmaticus, Shigella glexneri & S. sonnei.	Moskalenko 1986
Prunus pensylvanica	pincherry	Probable activities: β-sitosterol, see **Nuphar**	references under Nuphar
Prunus serotina (E. North America)		Amygdalin: antiinflammatory, antitussive, cancer-preventative, cyanogenic, expectorant.	Beckstrom-Sternberg & Duke 1994
		Clinical: sedative expectorant for cough	Claus et al 1970
Prunus serotina cont.		Probable activities: p -coumaric acid: antineoplastic, bactericidal, cholorectic, pesticide, lipoxygenase inhibitor, inhibits prostaglandin synthesis (which cause swelling, inflammation & fever); scopoletin: antispasmodic	
Sambucus racemosa	red elderberry	Clinical properties: plant contains purgative substances.	Kingsbury 1964
		Probable activities: ursolic acid is reported to be anti-diabetic & hypoglycemic, antiinflammatory, antileukemic, diuretic, hepatoprotective, anti-tumor, and cancer preventative, cytotoxic and a piscicide	Beckstrom-Sternberg & Duke 1994
		Bioassay: strong inhibition, respiratory syncytial virus	McCutcheon et al. 1995
Shepherdia canadensis	soapberry	Bioassay: anticancer properties, mouse mastocytoma cells	Ritch-Krc et al. 1996
Smilacina racemosa	Solomon's Seal, false		
S. hirta (Siberian)		moderately strong antibacterial activity, broad spectrum	Moskalenko 1986
Sorbus sitchensis and *S. scopulina*	mountain ash	No reports of activities.	
Sorbus acuparia (European)	rowan, mountain ash	Clinical properties: bark is astringent.	Grieve 1931
		Propable activities- Amygdalin: antiinflammatory, antitussive, cancer-preventative, cyanogenic, expectorant.	

TABLE 3-3 GITKSAN MEDICINAL PLANTS
BIOASSAYS AND CLINICAL PROPERTIES

Sorbus acuparia , cont.		Fruits have many active compounds; see above for ursolic acid, quercetin, p-coumaric acid, and amygdalin. Gallic acid: ACE inhibitor, anti- carcinomic, antifibrinolytic, antioxidant, antiseptic, antiviral astringent, bacteristatic, cancer-preventative, carcinogenic, hemostat, nephrotoxic, pesticide, styptic, xanthine-oxidase inhibitor. Also contain vitamins C & E.	
S. sambucifolia (Siberian)		Bioassay: fruits-strong antibacterial activity against all species assayed. Leaves-weak to moderate activity against Mycobacterium smegmatis, and Shigella sonnei and flexneri. Bark not tested	Moskalenko et al 1986
S. sorbifolia (Siberian)		moderately strong antibacterial activity against all species tested (fruits and roots)	Moskalenko 1986
Tsuga heterophylla	hemlock, western	No reports of activities found.	
T. canadensis		Probable activities: see above for activities of kaempferol, α-pinene, bornyl acetate, limonene;	Beckstrom-Sternberg & Duke 1994
Veratrum viride	Indian hellebore	Clinical:poisonous if ingested; causes central hypotension; used for synthesis of hypotensive drugs	Kingsbury 1964 Farnsworth & Bingel 1973
		Personal observation: smoke exerts calming effect on inhalation; inhalation of powd. dried rhizome induces violent sneezing and causes copious mucus discharge	LMJ observations
		Probable activities: hypotensive activity-germbudine, germidine, germine, isogermidine, neogermidine analgesic, counterirritant, emetic, mucoirritant, anti-parasitic, anti-louse and ruminotoric properties-veratrine; pesticide, insecticide or fungicidal activity-jervine, rubijervine and veratrine (roots), acetic acid	Beckstrom-Sternberg & Duke 1994
Veratrum viride , cont.		rhizome	
Viburnum edule	highbush cranberry	No reports found.	
Viburnum prunifolium (E. North America)		Clinical: dried rt. or stem bark-antispasmodic, uterine sedative (attributed to scopoletin & other coumarins).	Claus et al 1970
Viburnum opulus (E. North America)		Clinical: dried rt. or stem bark-antispasmodic, uterine sedative (attributed to scopoletin & other coumarins).	Claus et al 1970
V. burejasticum (Siberia)		Bioassays: antibacterial activity-bark weak to moderate against Mycobacterium smegmatis, E coli, E"crim" 2584, Shigella sonnei and Sh. flexneri	Moskalenko 1986
V. sargentii (Siberia)		Bioassay: antibacterial activity-lvs. strong activity against Staphylococcus aureus strains and E. "crim" 2584, moderate against Mycobacterium smegmatis, E coli, Shigella sonnei, and Sh. flexneri	Moskalenko 1986

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*hybrid swarm of *Picea engelmannii* , *P. sitchensis* and *P. glauca*

Table 8-4
Confirmation of Gitksan Medicinal Uses

Latin name(s)	Used by Other Groups	Similar Uses	Related species used	Active Chemicals	Bioassays	Clinical	Confirmation Level I
Abies lasiocarpa (A. balsamea ssp. lasiocarp	√ (7)	yes	4 (18)	yes	no	no	√
A. holophylla & A. nephrolepis					antibacterial		
Achillea millaefolium	√(53)	yes	√	yes	antibacterial	no	√
Alnus crispa ssp. sinuata	√ (5)	yes	√	yes			√
(=A. viridis ssp. crispa)							
A. viridis	√(2)	yes	√	yes		no	
Alnus incana/	√ (14)	yes(3/4)	√	yes	anti-cancer	no	√
A. rubra	√(10)	yes(3/4)	√	yes	antibacterial, antifung	no	√
Anemone ?lyallii or ?multifida	√(4)	yes	√ (9)	yes	no	no	√
Angelica genuflexa	√(1)	no	√ (13)	none reported	no	no	no
Angelica archangelica, A. sylvestris		no		yes			
Aralia nudicaulis &/or	√(6)	yes	√(14)	yes	no	no	√
Actaea rubra	√(15)	yes	√(6)	yes	no		√
Arnica cordifolia	√(3)	no*	√(4)	none reported	no	no	no
Arnica montana (European)				yes?			
Athyrium filix femina,	√(9)			none reported	no	no	√
Drypteris felix-mas	√(3)		yes	yes		[dissimilar]	no
D. expansa	√(4)		yes	none reported	no	no	√
Calla palustris	√(2)	no		yes	no	[toxic]	no
Castilleja miniata	no	no*	yes	yes?	no	no	no
Cornus stolonifera	√(23)	no	yes	yes	antibacterial (wk)	no	no
Equisetum arvense &	√(19)	yes	√(2)	yes			√
E. hyemale,		yes		yes	antibacterial (neg.)		√
E. variegatum,		yes		none reported	no		no
E. pratense		yes		none reported	no		√
Geum macrophyllum	√(11)	yes	√(4)	none reported	antifungal	no	√
Geum rivale & G. urbanum				yes			
Geum aleppicum					antibacterial (neg.)		
Heracleum lanatum	√(30)	yes		yes	antibacterial, antifungal		√
H. laciniatum				yes			
Inonotus obliquus and Fomes ignarius	√(4)	yes	2(4)	none reported	antibacterial	no	√
Juniperus communis &	√(27)	yes	1(4)	yes	antibacterial		√
J. scopulorum	√(16)	yes	1(4)	none reported	no	no	√
Ledum groenlandicum	√(20)	yes	yes	yes	no	no	√
Lobaria pulmonaria and L.oregana	√(3)	no		none reported	no	no	no
Lonicera involucrata	√(13)	yes	5(11)	none reported	antibacterial (neg.)	no	√
Lonicera (genus)				yes	antibacterial		
Lupinus ?nootkatensis	no	no	yes	prob. yes	none	[toxic?]	no

Table 8-4
Confirmation of Gitksan Medicinal Uses

Malus fuscus	√(11)	some	yes	none reported	none	no	√
Malus mandshurica					antibacterial	no	
Nuphar polysepalum (=*N. lutea* ssp.p.)	√(10)	yes	yes	none reported	antibacterial	no	√
Nuphar advena				yes			
Nymphaea odorata				yes			
Nuphar variegatum				yes			
Nuphar lutea				yes			
Oplopanax horridus	√(33)	yes		?	antibacterial, antiviral brine shrimp (neg.)	hypoglycemic?	√
P. x lutzii	√(1)••	yes	yes	none reported	no	no	√
P. engelmanii x	√(4)	yes					√
P. sitchensis x	√(7)	yes					√
P. glauca	√(6)	yes		yes	antimicrobial	no	√
P. mariana	√(6)	yes	yes	none reported			√
Picea abies		yes	yes	?	antibacterial, candicide		
Pinus contorta	√(13)	yes	yes	yes	antibacterial	no	√
Populus tremuloides	√(19)	some	yes	yes**	antibacterial (wk.)	no	√ ?
Prunus pensylvanica	√(6)	yes	7(46)	yes	no	no	√
P. serotina				yes		yes	
Sambucus racemosa	√(20)	yes	yes	yes	antiviral	emetic	√
Shepherdia canadensis	√(16)	yes	yes	yes**	anti-cancer	no	√
Family Eleagnaceae				yes			
Smilacina racemosa	√(20)	yes	yes	none reported	no	no	√
Sorbus sitchensis and *S. scopulina*	√(9)	yes	3(10)	? yes **	no	no	√
S. acuparia (European)				yes			
S. sambucifolia (Siberian)					antibacterial	no	
Thalictrum occidentale	no	no*	6(13)	yes**	no	no	no
Tsuga heterophylla	√(12)	no•	yes	none reported	no	no	no
Veratrum viride	√(20)	yes	yes	yes	no	[on hypotensives]	√
Viburnum edule	√(5)	some	4(14)	none reported			√
V. prunifolium				yes			
V. opulus				yes		antispasmodic & uterine sedative	
V. cassinoides				yes			
V. burejasticum (Siberian)					antibacterial	no	
V. sargentii (Siberian)					antibacterial	no	

NOTE: surveys of other species in genus, and groups using species not complete, systematic or global in area.

Mostly North American sources examined, and North American and some European species examined.

* other species use similar to Gitksan use **active chemicals may not relate to Gitksan use • confirming record not independent ••18 records for all 3 spp.

TABLE 8-5
EMPIRICAL "VALIDATION" OF GITKSAN MEDICINAL PLANTS

Species / Illnesses	Level	Number of Groups Using	Number of Consultants
Abies lasiocarpa		7	9
respiratory illness	III		
tonic	II		
Alnus incana/A. rubra		14,10	2
skin ailments	III		2
Equisetum arvense/E.hiemale		5,12	1,1
E. arvense diuretic, kidney	III or IV		1
/E.hiemale diurectic, kidney	II or III		1
Geum macrophyllum		11	1
sores (if fungal)	III		
Juniperus communis		27	8
respiratory illness	III		
tonic	III		
Nuphar polysepalum		10	17
tuberculosis	II or III		
Oplopanax horridus		33	29
respiratory illnesses	II or III		4
tuberculosis	II or III		4
wound dressing	II		3
skin wash	?II		2
diabetes	?IV		2
Picea glauca		18**	9*
tonic	II		
respiratory illness	II		
wounds, sores, burns	III		
Pinus contorta		13	9*
colds and respiratory illness	II or III		
wounds, sores, burns	III		
"sickness"	II		
Sambucus racemosa		18	5
emetic	II or ?IV		
Veratrum viride		20	14
skin	II or III		2
boils & swellings	II		(from Smith)
aches, pains (topical)	II		(from Smith)

Only plant uses which are validated above level I are included in the table; see Appendix for detailed validation ratings of other plants and uses

* includes both pine and spruce

** The spruce used by the Gitksan is a hybrid swarm derived from P. sitchensis, *P. engelmannii* and *P. glauca*. These three species together are used by 18 groups

TABLE 8-6
CONSULTANT CONSENSUS–
SEVEN MOST FREQUENTLY MENTIONED MEDICINAL PLANTS

Plant species/uses	number of consultants
Oplopanax horridus	29
tonic	7
respiratory illness or colds	4
TB	4
arthritis	4
blood/heart	4
purification, enhance luck	4
stomach, stomach ulcer	3
wounds, skin ulcer	3
cancer	3
headache	2
flu, stomach flu	2
cleanser, purgative	1
cure-all	1
smudge	1
Nuphar polysepalum	17
TB	6
fractures (poultice)	4
arthritis (poultice)	3
birth control (male)	2*
"sickness"	2
sores, wounds (poultice)	3
appetite stimulant (especially for TB)	1
aches & pains	1
liver	1
intestines	1
tonic	1
Veratrum viride	13
purification/smudge	9
protection (amulet)	5
hunting luck	5
bath (add to bathwater)	3
skin & hair	2
snuff for sinuses	2
"germ killer" (removes contamination)	2
nightmare remedy	1
sleepwalk treatment	1
Abies lasiocarpa	9
TB (mixtures or pitch)	4
tonic (mixtures)	3
purgative (pitch)	2
cuts or boils (pitch)	2
internal, intestive, liver	2
lung disease	1
arthritis (as cleanser)	1
Picea x lutzii and *Pinus contorta*	9
burns, boils, infected cuts, salve	9
tonic, 'wood medicine' (mixtures)	4**
TB	1
Juniperus communis	8
tonic (mixture)	2
'wood medicine' mixture	5
smudge (can be mixt.)	2
Sambucus racemosa	6
emetic (for treatment of inability to eat	5
smudge, mixt. for spiritual medicine	1

* Harlan Smith (n.d.) also reported this use
** 1 tonic, 3 'wood medicine'

Table 8-7
Medicinal Plants Occurring in Northwest British Columbia
Which are Not Used by the Gitksan-Plant Constituents

Plant Name	Groups Using	Constituents	References
Acer glabrum ssp. douglasii	4		
Allium cernuum	4	sulfur containing heterosides in other species	Schauenberg & Paris 1977
Amelanchier alnifolia	8		
Anaphalis margaritacea	14	polyacetylenes, pentanynene	Amason et al 1981
Apocynum androsimaefolium	10	cardiac glycosides	
Aquilegia formosa	3		
Arctostaphylos uva-ursi	15	allantoin, arbutin, α-amyrin, ß-sitosterol, betulinic acid, citric acid, formic acid, gallic acid, hyperin, isoquercitrin lupeol, malic acid , monotropein., myricetin, oleanolic-acid quercetin, quinic acid, tannin, ursolic acid, uvaol	Beckstrom-Sternberg & Duke 1994
Artemesia frigida	19	artemesia ketone, camphor	Amason et al 1981
Aruncus sylvester	8		
Aster foliaceous	2	alkaloids in genus	Marles 1984
Betula papyrifera	8		
Calypso bulbosa	1		
Campanula rotundifolia	6	some alkaloid content	Hamon et al 1980
Chimaphila umbellata	21	chimaphilin, arbutin, tannins, methyl salycilates avicularin, epicatechin gallate, hyperoside, ß-sitosterol kaempferol, nonacosane, ursolic acid	Amason et al 1981 Beckstrom-Sternberg & Duke 1994
Cicuta douglasii	3	cicutotoxin	Edwards 1980
Clintonia uniflora	2		
Cornus canadensis	9		
Corydalis aurea	3	alkaloids	Hamon et al 1980
Corylus cornuta	6		
Crataegus douglasii	4		
Disporum trachycarpum	1		
Epilobium angustifolium	16	tannins	Amason et al 1981
		chanerol	Pukhalskaya et al 1975
Fragaria virginiana	10	pl.-tannins, lf, arbutin, ellagic acid, leucanthocyanin, quercetin, quercitrin; fruits-caffeic acid, catechin, catechol, cholorogenic acid, ellagic acid, gallic acid, gentisic acid, glutamic acid, malic acid, p-coumaric acid, salicylic acid, vanillic acid	Amason et al 1981 Beckstrom-Sternberg&Duke 1994
Galium boreale	3		

Table 8-7
Medicinal Plants Occurring in Northwest British Columbia Which are Not Used by the Gitksan-Plant Constituents

G. odoratum		monotropein	Beckstrom-Sternberg & Duke 1994
G. odoratum & *G. aparine*		asperuloside	Schauenberg & Paris 1977
Goodyera oblongifolia	5		
Gymnocarpium drypoteris	1		
Habenaria dilatata	2		
Habenaria orbiculata	2		
Huperzia selago	1	various alkaloids including huperzine A	Ayer et al 1989
Kalmia polifolia	1	andromedotoxin	Kingsbury 1964
Leptarrhena pyrolifolia	2		
Linnea borealis	6		
Luetkia pectinata	2		
Lycoperdon spp.	2		
Lycopodium complanatum	2		
Lycopodium obscurum	6		
Lycopodium spp.	4		
Lysichiton americanum	15	calcium oxylate	Kingsbury 1964
Melampyrum lineare	1		
Mentha arvensis	12	many active chem's: (-)-carvone, 1,8 cineole, α-pinene, acetic acid, camphene, carvone, caryophyllene, eugenol, formic acid, furfural, hesperidin, limonene, linalool, luteolin menthol, menthone, myrcene, p-cymene, piperitone, pulegone, rosmarinic acid, thujone	Beckstrom-Sternberg et al 1994
Menyanthes trifoliata	2	caffeic acid, rutin, scopoletin, ascorbic acid, folacin etc.	Beckstrom-Sternberg et al 1994
Menziesia ferruginea	1		
Moneses uniflora	3		
Osmorrhiza chilensis	1		
Oxycoccos quadripetalis	1		
Paxistima myrsinites	3		
Plantago major	13	mucilage	Arnason et al 1981
Populus balsamifera ssp. trichocarpa	11	salicin, o-pyrocatechuic acid, catechin	Arnason et al 1981
		salicortin, populin, trichocarpin	Beckstrom-Sternberg & Duke 1994
Potentilla palustris	1		
Prunus virginiana	27	prunasin, tannins	Kingsbury 1964
Pteridium aquilinum	2	catechin, quercetin, kaempferol	Arnason et al 1981
Pyrola asarifolia	3	arbutin , chimaphilin in genus; methyl salycilates	Arnason et al 1981; Denford pers. comm

Table 8-7
Medicinal Plants Occurring in Northwest British Columbia
Which are Not Used by the Gitksan-Plant Constituents

Ranunculus acris	1	protoanemonin	Kingsbury 1964
Ribes bracteosum	3		
Ribes lacustre	5		
Ribes laxiflorum	4		
Ribes oxyacanthoides	3		
Rosa acicularis	7	tannins, cyanogenic glycosides likely	
Rubus chamaemorus	1		
Rubus idaeus	10	gallic acid, ellagic acid (tannins) (in plant, lf)	Arnason et al 1981
		leaves, plant: acetic acid, benzaldehyde, benzoic acid, ß-carotene, ß-ionene, cinnamyl alcohol, ethyl acetate, farnesol, lactic acid, niacin, p-cresol, succinic acid, tannin, thiamin, riboflavin; fruits: ß-carotene, butyric acid, caffeic acid, capyrilic acid, ferulic acid, formic acid, furfural, geraniol, malic acid, pectin, propionic acid, salicylic acid, succinic	Beckstrom-Sternberg & Duke 1994
Rubus idaeus , cont.		acid, tannin, valerianic acid	
Rumex crispus	3	quercetrin, tannins, emodin	Arnason et al 1981
Salix spp.	17	salycilates; salicin, *o* -pyrocatechol	Arnason et al 1981
S. alba (European)		apigenin, catechin, isoquercitrin, p-coumaric acid, quercetin	Beckstrom-Sternberg & Duke 1994
S. alba (cont.)		rutin, salicin, salicortin, salicylic acid, tannin, triandrin	
Smilacina stellata	8	alkaloids	Hamon et al 1980
Stachys cooleyae	3		
Streptopus amplexifolius	5		
Streptopus roseus	7	tannins	
Symphoricarpos albus	18		
Thuja plicata	12	probably thujene, thujone; other active or toxic chemicals '	
Tiarella trifoliata	1		
Typha spp.	22	tannins	Arnason et al 1981
		alkaloids present	Hamon et al 1981
Urtica dioica	29	histamine, formic acid, p-coumaric acid,scopoletin etc.	Beckstrom-Sternberg & Duke 1994
Vaccinium membranaceum	1		
Vaccinium spp. (6; 3 in Gitksan area)	10	arbutin, benzoic acid, catechin, caffeic acid, caryophyllene, chlorogenic acid, hyperoside, iso-quercitrin, oleanolic acid, p-hydrobenzoic acid, quercetin, quercitrin, ursolic acid quinic acid,hydroquinone, ferulic acid, citric acid, monotropein, nonacosane, oxalic acid, pectin, protocatechuic	Beckstrom-Sternberg & Duke 1994

Table 8-7
Medicinal Plants Occurring in Northwest British Columbia
Which are Not Used by the Gitksan-Plant Constituents

Vaccinium spp., cont.		acid, tannin [2]	
Viola adunca (2 prob. *V. glabella*)	4?	no alkaloids in *V. adunca*	Hamon et al 1981
Viola canadensis	1		
Viola spp (other species and *V.* sp)	7	alkaloids reported present in low amounts V. rugulosa	Hamon et al 1981

1 *Thuja occidentalis* contains tannins, thujone, fenchone, camphor, terpinen-4-ol, and bornyl acetate (Arnason et al 1981.)
2 data for *Vaccinum myrtillus*

Table 8-8
Medicinal Plants Occurring in Northwest British Columbia Which are Not Used by the Gitksan-Clinical Data and Activities

Plant Name	Groups Using (#)	Clinical Data and Activities	References
Acer glabrum ssp. douglasii	4		
Allium cernuum	4	antibiotic and anticancer activity of garlic *A. sativum*	Schauenberg & Paris 1977
Amelanchier alnifolia	8	antiviral activity at non-cytotoxic concentrations	McCutcheon et al. 1994
Anaphalis margaritacea	14		
Apocynum androsimaefolium	10		
Aquilegia formosa	3		
Arctostaphylos uva-ursi	15	moderately strong antibacterial activity arbutin: antiseptic, antitussive, bactericide, diuretic, urinary antiseptic, candidicide, insulin sparing tannins: astringent, antidiarrheic, antidysenteric, antiviral viricide, bactericidal, cancer-preventative, liver protecting clinical use: preparations for urinary tract infections **see Appendix 3 for more detail**	Moskalenko 1986 Beckstrom-Sternberg & Duke 1994 Schauenberg & Paris 1977
Artemesia frigida	19	Antifungal: *A. ludoviciana* and *A. tridentata*, aerial pts.	McCutcheon et al 1994
Aruncus sylvester	8		
Aster foliaceous	2		
Betula papyrifera	6		
Calypso bulbosa	1		
Campanula rotundifolia	6		
Chimaphila umbellata	21	arbutin: antiseptic, antitussive, bactericide, diuretic, urinary antiseptic, candidicide, insulin sparing; other chemicals-antiviral, antiinflammatory, diuretic, anti-histaminic, antitumor, hypoglycemic, and other activities methyl salicylate: analgesic, antiinflammatory, antipyretic antirheumatologic, carminative, counterirritant, allergenic **see Appendix 3 for more detail**	Beckstrom-Sternberg & Duke 1994
Cicuta douglasii	3	toxin: convulsions and respiratory failure cicutotoxin: antileukemic, convulsant	Edwards 1980 Beckstrom-Sternberg & Duke 1994
Clintonia uniflora	2		
Cornus canadensis	9		
Corydalis aurea	3		
Corylus cornuta	6		
Crataegus douglasii	4	many active chemicals in fruits of European species	

Table 8-8
Medicinal Plants Occurring in Northwest British Columbia Which are Not Used by the Gitksan-Clinical Data and Activities

Disporum trachycarpum	1		
Epilobium angustifolium	16	inhibits prostaglandin synthesis, antiinflammatory	Hiermann et al 1986
		antitumor activity (mice); hemagglutinating activity	Pukhalskaya et al 1975
Fragaria virginiana	10	chemicals: analgesic, antiviral, bactericidal, fungicidal, inhibits prostaglandin synthesis,antiinflammatory, antihemorrhagic, diuretic, etc.[1]	Beckstrom-Sternberg & Duke 1994
		F. vesca antiviral, influenza virus, polio virus, reovirus coxsackie virus type B, herpes simplex, influenza virus	Che 1991
		F. chiloensis (lvs.) antifungal activity against 9 species tes	McCutcheon et al 1994
Galium boreale	3		
G. odoratum (European)		monotropein: cathartic	Beckstrom-Sternberg & Duke 1994
		antispasmodic, cholagogic, diuretic	Schauenberg & Paris 1977
		used for liver infections and jaundice	
G. aparine (European)		vulnerary, cicatricizing, hypotensive, reduces temperature	Schauenberg & Paris 1977
		used in treatment of urinary tract disease	S. Shepard pers. comm. 1977
Goodyera oblongifolia	5		
Gymnocarpium drypoteris	1		
Habenaria dilatata	2		
Habenaria orbiculata	2		
Huperzia selago	1	huperzine A shows strong anticholinesterase activity	Ayer et al 1989
Kalmia polifolia	1	toxic; vomiting, non-specific GI irritation, can be fatal	Kingsbury 1964.
Leptarrhena pyrolifolia	2		
Linnea borealis	6		
Luetkia pectinata	2		
Lycoperdon spp.	2		
Lucopodium annotinum	1	no antibacterial activity	Moskalenko 1986
Lycopodium complanatum	2		
Lycopodium obscurum	6		
Lycopodium spp.	4		
Lysichiton americanum	15	antiviral activity against Herpes virus 1	McCutcheon et al 1995
Melampyrum lineare	1		
Mentha arvensis	12	acetylcholinesterase inhibitor, antialzheimerian?, anesthetic, antibronchitic, anti-cold, antilayrngitis and pharyngitis, antiseptic, antitussive, bactericide, CNS-stimulant, CNS-depressant, choleretic, counterirritant,	

Table 8-8
Medicinal Plants Occurring in Northwest British Columbia
Which are Not Used by the Gitksan-Clinical Data and Activities

Mentha arvensis , cont.		expectorant, fungicide, hepatotonic, hypotensive rubifacient, sedative; acidulant, anti-ototic, antivaginitic, fungicide, mucolytic, protistacide, verrucolytic, antiinflammatory, cancer preventative, antiseptic, carminitive vermicide, antiedemic, spasmolytic; analgesic, anesthetic, anti-prostaglandin, antiulcer, candidicide, febrifuge, antisyncopic, astringint, antiallernegic, antioxidant, antistomatitic, antiviral, viricide, diuretic, xanthine oxidase inhibitor, aldose reductase inhibitor, antiodontologic antipruritis, antineuralgic, antirheumatic, antisinusitic, bradycardic, bronchomucolytic, bronchorrheic, gastrosedative, vibriocide; antimutagenic, antinociceptive, antiflu, antiasthmatic, flea repellant, antianaphylactic, anticomplementary, antipyretic, antiherpetic, antihepatotoxic, antileukotrienic, antilipoperoxidant, antioxidant, antiradicular, antishock, antithyreatropic; but also cerebrodepressant, convulsant, epileptogenic, hallucinogenic, respirainhibitor (thujone) , cerebrotoxic and hepatotoxic (pulegone), tumor-promotor (from linalool), irritant (limonene, eugenol),anti-DNA and RNA (hesperidin), ulcerogenic, (eugenol, acetic acid) cytotoxic, antifeedant(eugenol), spasmogenic (camphene), osteolytic & spermacide (acetic acid)	
Menyanthes trifoliata	2	scopoletin-antispasmodic	Beckstrom-Sternberg & Duke 1994
Menziesia ferruginea	1		
Moneses uniflora	3	strong antifungal activity	McCutcheon et al 1994
Osmorrhiza chilensis	1		
Oxycoccus quadripetalis (=*Vaccinium oxycoccus*)	1	probably similar to *Vaccinium macrocarpon* used to treat cystitus	
Paxistima myrsinites	3		
Plantago major	13		
Populus balsamifera ssp. *trichocar*	11	analgesic, antipodagric (gout), fungicide	Beckstrom-Sternberg & Duke 1994
Potentilla palustris	1		

Table 8-8
Medicinal Plants Occurring in Northwest British Columbia Which are Not Used by the Gitksan-Clinical Data and Activities

Prunus virginiana	27	cyanogenic, spasmolytic, probably antitussive	Claus et al 1970
Pteridium aquilinum	2		
Pyrola asarifolia	3		
Ranunculus acris	1	vessicant, counter-irritant, GI irritation, toxic	Kingsbury 1964; Turner 1984
Ribes bracteosum	3		
Ribes lacustre	5		
Ribes laxiflorum	4		
Ribes oxyacanthoides	3		
Rosa acicularis	7	*Rosa nutkana* shows strong activity against interic coronavi	McCutcheon et al 1994
Rubus chamaemorus	1		
Rubus idaeus	10	fruits antiviral (coxsackie virus type B, polio virus type 2, reovirus type 1, herpes simplex, influenza virus) activities (fruit&leaves): bactericide, antivaginitis, expectorant, fungicide, mucolytic, protistacide, anaesthetic, & analgesic, antipeptic, antiseptic, narcotic, spasmolytic, antiotitic, febrifuge, vulnerary, cancer-preventative & various anticancer activities, bruchifuge, various antiviral & virucidal activities, anti HIV, choleretic & hepatotropic, candidicide & fungicide, pesticide, ACEinhibitor, xanthine oxidase inhibitor, anticataract, antimutagen, astringent, hemostat, CNS depressant, carminitive, stomachic, stimulant, anti-dysmenorrheic, uterosedative & uterorelaxant, arteriodilator, cardiac, antisyncopic, antifibrinolytic, counterirritant, styptic, sedative, keratolytic, antixerotic antileukorrheic, hemopoietic, sialogogue, antiatheromic antidiabetic, antidiarrheic, antitussive, antiulcer, demulcent, hypocholesterolemic, antieczema, antiinflammatory antiperiodic, antipodagric, antipsoiriac, antipyretic, antirheumatic, febrifuge, tineacide, psychotropic; also ulcerogenic, allergic, emetic, cytotoxic, embryotoxic, nephrotoxic, & irritant	Che 1991 Beckstrom-Sternberg & Duke 1994
Rumex crispus	3		
Salix spp.	17	analgesia, febrifuge, antiinflammatory	Beckstrom-Sternberg & Duke 1994

Table 8-8
Medicinal Plants Occurring in Northwest British Columbia Which are Not Used by the Gitksan-Clinical Data and Activities

Salix alba (European)			
Smilacina stellata	8		
Stachys cooleyae	3	[stachys chem's or activities??]	
Streptopus amplexifolius	5		
Streptopus roseus	7		
Symphoricarpos albus	18		
Thuja plicata	12	probable CNS depressant	Beckstrom-Sternberg & Duke 1994
Tiarella trifoliata	1		
Typha spp.	22		
Urtica dioica	29	vessicant, counter-irritant	
Vaccinium membranaceum	1		
Vaccinium spp. (6; 3 in Gitksan an *V. myrtillus*	10	V. myrtillus: arbutin see **Arctostaphylos** astragalin: aldose-reductase inhibitor, antileukemic, expectorant, hypotensive, immunostimulant; benzoic acid: allergenic,anesthetic, antiotitic, antiseptic &bactericide,expectorant, febrifuge, fungidice, vulnerary caryophyllene: antiedemic, antiinflammatory, spasmolytic catechin: antialcoholic, antiarthritic, anticariogenic, antiedemic, antiendotoxic, antiflu, antihepatitic, antiherpetic antihistaminic, antihyperlipedemic, liver protecting, antiperiodontic, antiulcer, antiviral and viricidal, astringent cancer-preventative but carcinogenic, fungicide, hemostat, immunostimulant, lipoxygenase inhibitor; caffeic acid: antiviral & viricide, bactericide, cancer-preventative, choleretic, fungicide, liver-protecting & toning, histamineinhibitor, leukotriene inhibitor, lipoxygenase ihhibitor, spasmolytic, vulnerary, tumorigenic chlorogenic acid : allergenic, analgesic, anti-tumor promoter antihepatotoxic, antioxidant, antiviral, antipolio, antiseptic bactericide, cancer-preventative, choleretic, clastogenic, diuretic, histamine inhibitor, leukotriene inhibitor hydroquinone: allergenic, antimalarial, antimelasmic, antimenorrhagic, antinephritic, antipertussive, antiseptic,	

Table 8-8
Medicinal Plants Occurring in Northwest British Columbia Which are Not Used by the Gitksan-Clinical Data and Activities

V. myrtillus , cont.		antithyreotropic, antilithic, astringent, irritant, trypanosomicide; protocatechuic acid: antiarrhythmic, antiasthmatic antiherpetic, antiviral, viricide, antioxidant, antitussive, bacteridice, fungicide; lycopene: antioxidant, antiradicular, antitumor, cancer-preventative; oxalic acid: antiseptic, hemostatic, renotoxic & can be fatal; p-hydrobenzoic acid: antisickling, bactericide, cancer-preventative see Table 8-3 for other chemicals.
Viola adunca (2 prob. *V. glabella*)	4?	
Viola canadensis	1	
Viola spp (other species and *V.* sp	7	

Properties presented in this table are not a comprehensive and systematic listing of the properties of the constituents or extracts of the plants; they are intended to give some idea of potential medicinal properties

1 See Table 3 and Chapter 7 for more detailed properties of the many active chemicals found in strawberries.

Notes

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[1] The terms biobehavioural (Etkin 1986) and biocultural (Armelagos *et al.* 1992) have been used somewhat interchangeably in medical anthropology to describe analyses that attempt to incorporate cultural, or "emic" perspectives, together with those of biomedicine, biology, physical anthropology and ecology, in analysis of ethnomedical systems.

[2] Foster and Anderson erect the two broad categories of "naturalistic" and "personalistic", and emphasize agency in the latter concept. I prefer to conceptualize the non-naturalistic ailments as "spiritual", recognizing that in many cultures and specific instances, there is the concept of specific agency acting out of malice or in response to transgressions of persons, most frequently the one who becomes ill. In the Gitksan perception, there certainly are instances of illness which could be called "personalistic", and which might be caused by a specific instance of aggressive witchcraft or sorcery, or by a specific transgression of correct behaviour responded to by a specific 'supernatural' entity. In other cases, it seems that failure to carry out correct behaviour is manifested in a more general lack of cleanliness, luck or wellness, perhaps not attributable to a specific defined agency external to the person suffering illness.

[3] See Byron Good (1994) for some cautionary perspectives on the attempt to use a biobehavioural or empirical validation methodology in medical anthropology. His critiques center on the privileging of the biomedical perspective and of empiricist views as truth, while marginalizing (presumably "counter-factual") views and explanations of lay persons or members of other cultural groups as "belief".

[4] It must be borne in mind that symbolic uses are not necessarily non-efficacious. See comments of Romanucci-Ross et al 1983:x in discussion p. 26; also Etkin (1988) gives examples of the empirical efficacy of various red plants, ostensibly chosen for their symbolic colour association with blood, for skin conditions (Etkin 1988: 27).

[5] Defining the term "empirical", and deciding what types of shared perception count as empirical cannot be undertaken without consideration. For example, if empirical truth is taken to be the direct perception of something, then a spirit or vision is empirically present in the same way as any other natural phenomenon. From the perspective of Western rational

empiricism, some types of perception are false and are illusions or delusions, and do not count as empirical truth (cf Goldman 1988). (Instances of spurious perception arising in the nervous system such as phantom limb perception would be seen as evidence that sensory evidence can be misleading and would support a normative concept of valid perception). One key aspect of experience which has to be satisfied for it to be considered valid empirical evidence in the Western tradition is that it must be actually or potentially shared. If not, it can be considered a false perception arising from a state of imbalance or illness and dismissed as a meaningless hallucination. This rules out the perceptions of a schizophrenic as valid empirical reality, although they are indeed perceived by the schizophrenic, but includes shared vision perceptions such as may be experienced in Native ceremonies. There is therefore a social dimension to truth. Each society, and each discipline within the Western academic tradition has its own rules of evidence, what counts as proof of truth, and what kinds of things can be 'true'. Some discussion of this is also given in Watson and Goulet (1989) and Latour and Woolgar (1979), and Good (1994). Good contains an extremely thought provoking analysis of the term "belief", and a cogent discussion of the primacy of an empiricist perspective (1994:39) in much medical anthropological work.

[6] Browner *et al.* (1988) show the applicability of a biobehavioural perspective understanding the culturally defined illness, *susto*, often assumed to be related to depression by outside observers. They note two things: 1) that *susto* sufferers did not sort out to any particular diagnosis by mental health diagnostic instruments administered to them, and 2) that there were definite elevated risks for morbidity and mortality with a diagnosis of *susto* [whatever it might be in biomedical terms], which other chronically ill people with a variety of mental illness factors did not share. Paul Allen Cox has also discussed Samoan illnesses which could not be easily equated with any biomedical diagnoses; nonetheless, these had serious and demonstrable effects on Samoan sufferers (personal communication 1988 Ethnobiology Meeting, Mexico City). Perhaps in this instance the sort of analysis carried out by Rubel *et al.* would also have been instructive even if it did not elucidate an underlying cause or diagnosis comprehensible with current biomedical understandings.

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[7] See Note 4. Elois Ann Berlin discusses the "mapping" of ethnomedical understandings onto biomedicine in the introduction to Berlin and Berlin (1996). For their purposes, the "naturalistic" diseases are readily analysable in terms of a biobehavioural, or empirical approach, where the "personalistic" illnesses (see note 2) are best approached from other paradigms.

[8] Anderson (1991) discusses several studies intended to investigate efficacy of traditional treatments for resolution of symptoms which can be evaluated from a biomedical perspective, including the psoriasis study done by David Young and colleagues at the University of Alberta (Morse *et al.* 1987). Possible criticisms of Morse *et al's* approach include the use of biomedicine as the yardstick against which to measure results. Young (personal communication 1994) has discussed with me the healer Russell Willier's sense that the study design and necessity of treating patients in a non-traditional setting caused the treatments to be less effective than when patients were treated intensively at his home. Young subsequently observed dramatic remission in two serious cases of psoriasis which were treated by Willier at Sucker Creek after the Edmonton based study had been finished (Young *et al.* 1988).

[9] The NAPRALERT database is maintained by Norman Farnsworth and his associates at the University of Illinois. The data derived from the NAPRALERT search are cited under the original publications.

[10] Devil's club, Sitka spruce, western red cedar, western hemlock and skunk cabbage (*Lysichiton americanum*) are examples of plant whose ranges center in northwestern North America. The ranges of Lodgepole pine and subalpine fir are also centered west of the Rocky Mountains, although widely distributed in western North America.

[11] Young *et al.* (n.d.) discuss the probability of coincidental agreement in plant uses between separated groups and apply a correction factor to enhance certainty that two uses will occur because of empirical efficacy rather than chance. I have chosen not to pursue the type of quantitative analysis they use, but have taken into account the number of confirming

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records vs. the total number of records of use. Obviously, the higher proportion of confirming uses, and the greater the number of different cultural groups having similar uses, the higher the likelihood that there is an empirical efficacy to the medicine.

[12] Kelley Bannister (personal communication March 1996) suggested in most instances that the methanolic fraction would not differ from the aqueous extracts used in traditional North American medicinal preparations. For *Equisetum hiemale* and *E. arvense*, however, antitumor properties of acid [=aqueous?] and alcohol extracts differed, with the acid extract of *E. arvense* and the alcohol extract of *E. hiemale* showing activity, where the other extract did not (Belkin *et al.* 1952).

[13] These include *Inonotus obliquus*, *Equisetum arvense*, *E. hiemale*, *Achillea millaefolium*, and *Arctostaphylos uva ursi*, used for food but not medicine by the Gitksan.

[14] The spruce used by the Gitksan is a hybrid swarm of three species, one of which is *Picea glauca*. The *Picea glauca* used for this assay was obtained from north central British Columbia about 250 km east and a bit south of Gitksan territory.

[15] Bathing could also treat skin conditions and ectoparasites, see below.

[16] "Killing germs" is a general concept which relates to the idea of cleansing and removing "dirt" which can cause disease. Because modern Gitksan are exposed to medical doctors and biomedicine, people use the vocabulary of biomedicine to express their own conceptions of illness prevention. Smudging a house would be unlikely to kill bacteria or viruses in the air, although it might be effective against non-material causes of disease; however, washing clothes with grated rhizome along with detergent might indeed kill germs in the biomedical sense, and could probably rid clothing of vermin as several of the compounds in Indian hellebore roots, at least, are toxic to lice and ectoparasites.

[17] The practice of fasting before using certain types of medicines, overtly as aspect of self control or cleansing, would certainly enhance the pharmacological effects in many instances.

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[18] Restoration of function reportedly did occur in the instance I was told about-see Chapter 6

[19] Other methods of responding to influenza epidemics were frankly non-material as in the medicine woman of sickness narrative by Robert Wilson (Barbeau 1958 :74-75) mentioned in Chapter 6.

[20] The otter possession cure narrated in Chapter 6 also contains an element of this treatment; the patient is hung upside down over the smoke of various aromatic conifer branches as well as being doctored by the shaman, and treated with the 'urine' of the dead otter.

[21] By personal observation, violent sneezing is certainly produced by nasal inhalation of powdered dried rhizome, followed by copious mucous discharge lasting perhaps for 15 minutes (fieldnotes-9/14/88).

[22] As in all cultures, there is intra-individual variation in medical plant knowledge and usage among the Gitksan. One individual Gitksan woman does use *Veratrum viride*, with great caution, as an internal medicine, though not as an emetic. She is aware that others do not use it because of concern over toxicity.

[23] Daniel Moerman (1994) reviews plants used both as foods and medicines by North American Native people.

[24] The wintergreen family, Pyrolaceae, is sometimes considered a distinctive subfamily within the heather family Ericaceae, to which the blueberries, huckleberries, cranberries, labrador tea, and kinnikinnik (*Arctostaphylos uva-ursi*) belong. Chemically the wintergreens do appear to be related to the genera of the heather family in the strict sense.

[25] Those who are materialist and empiricist in their basic perspective might attribute this to a relatively weaker material basis for action in the case of "spiritual" conditions than those of a predominantly physiological cause.

[26] *Vaccinium vitis-idaea*, present in the northern portions of Gitksan territory, also has abundant active phytochemicals, some in rather high concentrations (Beckstrom-Sternberg et al. 1994); see Chapter 7. Several of

its active chemicals are also in *A. uva-ursi* and *Chimaphila umbellata*, also not utilized by the Gitksan.

Chapter Nine
Looking Backward toward Meaning
Summary and Conclusions

Gitksan knowledge and use of plants, that is, ethnobotany, can be looked at from many perspectives. Plants are significant in the aboriginal economy (as indeed they are in the modern resource based economy of the region). How the land is seen, how plants are named and how this knowledge is organized, give insights into the relationships of a particular people with their land, and also illuminate the breadth of human perspectives on land and plants. I have attempted to understand, insofar as it is possible for an outsider who has shared life, work, friendships, and concern for the land is able to understand, a Gitksan view of how the world works, and what things are truly important. I was gradually drawn into many of these areas of inquiry as I began to explore the ramifications of what I knew, and what I was learning as I explored Gitksan ethnobotanical and healing knowledge. I began with a science orientation, and an empiricist perspective, although I also had an anthropological background, early cross-cultural experience, and a fundamental cultural relativism.

I brought into the research my own knowledge of the plants and the landscape. As I went along I realized that Gitksan names might not correspond one-to-one with Latin scientific names of the plants I knew, that Gitksan understanding of the land might not replicate the concepts of habitat and plant/ecological community which were foundations of my vision and training. Rather early I reasoned that an understanding of the logic of Gitksan plant use for medicine was impossible without an understanding of the logic and reasoning, the concepts of what illness was and how the world works, which shape Gitksan experience. Also at the beginning of my work I began to search for what insight into potential effectiveness of traditional medicines might be gained from the phytochemical and pharmacological literature–an endeavour which was supported by the Gitksan-Wet'suwet'en Tribal Council and whose results were of strong interest to my Gitksan colleagues. These were the origins of my own "biobehavioural" research orientation. Sometime after I had begun my research, I came across the publications of Nina Etkin (1986, 1988; Etkin and Ross 1983), Carol Browner (1985; *et al.* 1988) and Bernard Ortiz de

Montellano (1986 and the previously cited 1988 paper). I found their approaches articulated and confirmed the research approach I had already embarked upon. Somewhat later, I began to look more critically at the cultural trappings of western science, and its overriding assumption of a monopoly on truth. I began to appreciate the incommensurability of indigenous understandings of illness with those of biomedicine, or at least the difficulties in translating the concepts of one into the other (cf. Good 1994, quoted below). I also spent long hours pondering how to deal with Gitksan conceptions which did not fit with Western scientific perspectives, such as supernatural agency and spiritual potency.

The biobehavioural perspective I have taken in looking at healing knowledge and use of plants by Gitksan people is a particular way of looking at an array of traditional knowledge and healing practices. The perspective that I have presented is pervasively influenced both by my own notions, derived from Western science, of causation and the nature of the material world, and of the bounds of my subject of inquiry: how Gitksan people use plants in relationship to their understanding of illness and wellness. Gitksan people might likely present their understandings in different ways, and draw different points of connection between aspects of their relationship with the natural world, their use of plants, and spiritual and cosmological beliefs. I believe, however, that the insights I have presented are useful and valid, and I have tried to understand and be respectful to Gitksan perspectives while searching for the points of overlap with my more biologically and scientifically based understandings. In the process, I find that my own understandings have also widened, and that I have learned things which I apply in my own perspectives on the world from my Gitksan teachers.

Representation of the healing knowledge of others is always somewhat problematic, as Good (1994) has suggested, and evaluation of questions of efficacy, central to a biobehavioural program, far from value-free.

> How do we represent the claims to knowledge of healers in another society, given the authority of biomedical knowledge? How do we situate our analyses of diverse traditions of medical knowledge and practice...in relation to medicine? How do we maintain a conviction that popular medical cultures represent genuine local knowledge, given the corrosive authority of

> biomedical science and the obvious efficacy of its preventive and therapeutic measures? The issue is not simply that of the "efficacy of traditional healing." Questions of the efficacy of clinical medicine...are often quite distinct from the truth claims of biomedical science, and the same is even more true for other forms of healing. The question is rather how we situate our analyses of cultural representations of illness...in relation to the truth claims of biomedicine." (Good 1994:28)

Good has critiqued an empiricist approach to medical social science, a critique which might be applied to a biobehavioural analysis of medicinal plant use:

> What I am calling here the common-sense or empiricist approach in the medical social sciences has three essential elements: the analysis of illness representations as health beliefs, a view of culture as adaptation, and an analytic primacy of the rational, value maximizing individual. ...taken together these constitute a form of "utility theory," in Sahlins' (1976a) terms, which reproduces conventional understandings of [our] society even while introducing culture into the medical paradigm." (Good 1994: 39)

I differ from Good in several important ways, while finding his reflections important and thought provoking. One is in the use of the word belief; I do not necessarily mean that a concept described as a "belief" must be counterfactual. Nor do I exempt my own concepts from that label. Instead, I consider the word to be neutral with regard to truth claims, which allows one to sidestep the necessity of debating competing truth claims of incommensurable systems of understanding. I also feel that one must essay to build some bridges for cross-cultural comparison and understanding, and that efficacy, while not the only measure of healing practices, is worthy of investigation. It is certainly of interest to the Gitksan, as well as to medical practitioners and others concerned with indigenous health in the region.

I have elsewhere argued that an adaptationist perspective can be useful (Gottesfeld 1993), and feel that such perspectives also have value in medical anthropology. Efficacy in healing is certainly "adaptive" in the most classic sense of promoting individual, and probably group, survival. I do not see the necessity to posit a rational, value maximizing individual in an empirically rooted examination of ethnomedical knowledge and practice to examine how human physiology and the physical and chemical properties of plants may bear on cultural choices regarding the use of plants for healing that incorporates an emic, or cultural perspective. I have argued that a reductionist perspective obscures much of the complexity of the process of healing and the nature of plant use.

I have explored the degree to which a biobehavioural perspective sheds light on Gitksan use of plant medicines in Chapter 8. While useful, many areas of profound cultural significance are not illuminated from such a perspective, because of the bounds of the biomedical perspective on wellness and illness, and the reductionist body-as-machine perspective embodied in medical paradigms of disease and its treatment. Despite a recognition of the limitations of a biobehavioural analysis, I do not feel that an empirical or biobehavioural perspective necessarily "reproduces the conventional understandings of [our] society", as Good charges above.

Some aspects of the exploration of Gitksan land, plant and healing knowledge might well be illuminated by an analytical focus on meaning, such as Good and his colleagues employ (Good 1994; Good *et al.* 1992). I share Good's concern for adequately respecting the knowledge of others, and the frequently hidden pejorative content of the word "belief" as it is used in representing the health and healing knowledge of lay persons and people in other cultures.

It is clear that a great deal more is involved in the experience of wellness and illness than a mechanistic functioning or malfunctioning of a body-as-machine. There are strands of healing practice and understanding in modern Western culture which acknowledge the integration of the human being as a simultaneously physical/mental/spiritual entity, and which see the importance of the mental and spiritual facts in the quality of life, experience of illness and potential for healing. I have also alluded to feedback mechanisms between these various levels in terms of influence of "mental" state on immune function, and the potential for ritual to effect healing that is observable on a biomedical level. The relationships of individuals to their communities and the influence of personal networks of relationship are also acknowledged by many health practitioners and other healers as having great significance both in the experience of illness or wellness, and the process of recovery from illness. When recovery does not or cannot occur, the spiritual and communal are of paramount significance in the experience of dying, and of the response of the relatives and community to the fact and manner of death.

Gitksan traditional healing often begins with the family, and treats the whole person. The person is not abstracted from context in the process of healing, except in the past where life threatening illness required prolonged treatment and required training as a shaman (or initiation into one of the Secret Societies) in order to control the power which threatened to overwhelm the patient. (A modern analogue is being shipped out to Vancouver for treatment; even there, family members are likely to form a local network and mediate the experience of illness). Death, when it occurs, is in the context of both family and community. Family members surround the dying person, and friends come to bid a final farewell.

Spiritual power is a concept which is central to Gitksan conceptions of the land, and of human health and healing. Wholeness, a oneness, wherein the spiritual power flows between entities, mediated by respect as I have discussed above, is central to health. This wholeness is situated in both personal history and in group history–who one is, where one belongs. Everything is in relationship. Heather Harris (personal communication 1994) has emphasized **dax̱get**, power, which follows from self discipline and proper respect. It is also an important aspect of people's relationship to land; **dax̱get**[1] flows from the land to the people, and the people, through their care of the land and their demonstration of their relationship to the land in the feasthall, also maintain the **dax̱get** of the land. When the land is healthy, it is bounteous, and the people are healthy and have wealth to share with others. When the people lack in **dax̱get**, they may fail to fulfil their social obligations, and the prestige of the **Wilp** may decline. The land too will decline in productivity, in turn lending less power to the people whose territory it is. The health of both people and land is diminished.

The most significant Gitksan healing plants, those most widely known and used, are those which are seen to have strong spiritual power in addition to physical healing properties. Devil's club and Indian hellebore are known to everyone; the respect for the power of these plants is evident even in young people. The boughs of the juniper bush are also felt to have strong spiritual power, and some of the medicinal uses of cow parsnip, also a food plant, show a sense of spiritual potency. Other commonly used medicinal plants, such as balsam or spruce, are not spoken of in a way that suggests more than ordinary levels of power. The spiritually powerful plants are often employed as fumigants, where their immaterial essence is released into the air by the process of burning. Such fumigants are used to cleanse dwellings, ward off illness, and treat what might be described by outsiders as emotional or mental illnesses, including problems of severe imbalance such as substance abuse or other abusive or self-abusive patterns.

I have speculated on the reasons why the most significant medicinal plants are those with particularly strong spiritual potency. In general, of course, the sacred is more resistant to change than the profane. While the Gitksan world view does not really separate sacred and profane realms as spiritual power pervades all of creation, it is true that some entities and places contain more power than others. One might comment that the effectiveness of Western biomedicines for infectious disease and infections, and conditions like diabetes, renders indigenous medicines for those types of conditions less important. An obviously important aspect of the undiminished importance of spiritual plants is the significance of spiritual factors as underlying causes of disease in the Gitksan understanding of illness and wellness. It is also more difficult to apply some external standard of efficacy to medicines which act in a non-material way, and so, perhaps, more difficult to supplant medicines which have long commanded reverence and esteem with new therapies and medications. Another factor which contributes to the importance of spiritual medicines for modern Gitksan, as for other North American First Nations peoples, is that the traditional spiritual realm can serve as a focus of a positive Indian identity because it is culturally central and easy to contrast with mainstream Eurocanadian and Euroamerican belief and practice.

The Gitksan understanding of the world and of life as cyclical produces profound differences in viewpoint on human relationship with the land, on the origin and preservation of knowledge, and on the perspectives on illness and death. A reciprocal giving, taking with respect for proper use, and resultant regeneration pervade the relationship with resource species. Respect and thankfulness are paramount social factors in the health of both people and land. People too may be reborn (Mills 1988, 1994 a,b; Harris 1994). It is unclear what proportion of Gitksan see themselves as reborn, or expect to be reincarnated, but it is a pervasive cultural theme, and certainly discussion of who has been reborn in young infants is common-place. The respect for dreams and insight as sources of knowledge is also partially rooted in this cycle of rebirth; memory may persist beyond the individual life, just as the names remain, to be taken up by the new generations as the previous bearers pass on. Christian belief modifies this cyclical perspective. Some Gitksan people who are Christian desire to transcend the world and dwell in Paradise with God and with Jesus (cf. Mary Johnson interview notes 8/95). However, even for those who are Christian, ancestral spirits may remain close at hand to advise and assist with their wisdom and knowledge as needed (Marie Wilson personal communication ca 1986).

The Gitksan cyclical world is also a world of reciprocal exchanges, of gifts given, accepted with thanks, acknowledged with respect, and repaid with gifts in the appropriate season. The human world and the relations of humans with the land are both seen in this perspective. The concept of balance is also fundamental to the persistence and functioning of both people and of the world. In the large scale, imbalance leads to a failure of the land and its resources to reproduce themselves and maintain themselves in a state of health. Many Gitksan fear the consequences of non-Gitksan resource development, especially of forest and fishery resources. It is plain from both a Gitksan and non-Gitksan ecological perspective that present practices degrade the land's productive capacity, including capacity for fish production, and that harvest levels of both trees and salmon are not sustainable.[2] It is also repugnant to Gitksan and Wet'suwet'en to value aspects of the land comparatively on a quantitative model; fur-bearers, berry plants, trees, flowers and small plants, forest animals, and fish, are all seen as equally having the right to live, and to be deserving of respect (Ian Anderson, personal communication; also see comment by Sadie Howard at the end of Chapter 5).

As explained in Chapter 6 and elsewhere, human health is also seen as a matter of balance and is not separate from moral or social realms. He or she who has remained in balance, exercised self-restraint and hard work, and fulfilled his or her duties and obligations, will increase personal power or **daxget**, and will be both successful and healthy.

This framing of the meaning of the human relationship with land, and of health or illness and ways of healing is fundamental to Gitksan experience, but far removed from an externally interpretable biomedical comparison of symptoms and diseases, and the physical or chemical properties of the plants used to treat illness.

Gitksan life takes place in a world where the human and social are not separate from the land itself. Gitksan history and social structure are both written on the land, and the land sustains the people and gives them health when treated with respect and care. The Gitksan use many plants in their environment for food, medicine and technology, traditionally enabling a rich and varied diet to complement the riches of the salmon and wild meats, medicines to treat commonly encountered ailments and causes of disease, and the means to produce dwellings for shelter from the elements, tools to meet material needs, and a complex and beautiful art which encapsulated social and spiritual relations and surrounded people with richly symbolic images. Gitksan concepts like respect and reciprocity are present in the perception and use of plants found in their environment. Knowledge about plant uses is passed in families, and is contextualized in the interaction with land which comes about in the course of the annual cycle and movement on the territories of one's House and the House of one's father's relatives. Understandings of where to gather plants are framed in this context; ecological knowledge is not general and abstract, but very particular, rooted in deep knowledge of specific territory. Plants which are salient or useful are named and known to most Gitksan. Unlike some cultures, many plants which occur in the environment may not be named. Some people with extensive bush experience and strong personal interest know many more plants than most Gitksan. Gitksan approaches to ordering their plant knowledge are not generally characterized by strict taxonomic relations of hierarchical inclusion, but are more often loosely based in ecological and utilitarian features. Several reflective Gitksan speakers expressed discomfort with what they perceived was the English Canadian tendency to view plants, and other things, in restrictive boxes, rather than seeing things in relationship, in a holistic perspective.

The residential school and modern school education which children have received over the past couple of generations have made serious inroads into the plant and medicinal knowledge of younger Gitksan people.

People who are middle-aged or younger may recognize few medicinal plants, even though they are aware in a general way that devil's club, for example, is a strong medicine. This erosion of plant knowledge is being countered in some of the Gitksan educational efforts such as the immersion program at Gitwingax̲, in the youth camps, where young adults are being shown important medicinal plants and how to use them, and in the Territory Management Program[3] . It is significant that devil's club, Indian hellebore, and juniper are particularly likely to be included in these cultural educational efforts. New medicinal plant practices are also being taken up by modern Gitksan, such as use of sage or sweetgrass for smudging, or use of Asian herbs such as ginseng.

Important cultural conceptions of health and illness remain strong in modern Gitksan life, even while experience with Western biomedicine in the form of visits to doctors, hospitals and the village clinics is universal. Cleansing and spiritual potency, use of protective and tonic medicines, a holistic perspective, and a sense of diet and being on the land as important to health are typically shared by modern Gitksan people. The potency and effectiveness of various Western medical treatments, especially antibiotics and other medications such as those for bloodpressure and diabetes, is certainly appreciated by modern Gitksan as well. Gitksan patients take advantage of what Western medicine offers in dealing with accidents and physical trauma, and include biomedical therapies in their search for healing when suffering from conditions like cancer, lupus, diabetes, or rheumatoid arthritis. Other compatible types of healing will also be incorporated by individual Gitksan, including alternative therapies such as massage, herbal remedies, reflexology, visualization techniques, vitamins, chiropractors, homeopathy, and less mainstream approaches such as psychic surgery.

I have undertaken a biobehavioural analysis of Gitksan medicinal plants to try to gain an understanding of the factors may which promote their use. I have taken similar use by other cultural groups as an indication of the probable empirical efficacy of Gitksan botanical remedies, especially if a number of different groups use the same plant in similar ways for similar conditions. Browner et al. (1988) have erected a scheme of four levels of empirical validation of medicinal plant use; use by other cultural groups is Level I in their method. Another complementary method of discovering plant uses which are likely efficacious is by consensus between a number of consultants within one cultural group. Trotter and Logan (1986) and Johns *et al.* (1990, 1994) have used this method. I also examined the number of consultants reporting use of different Gitksan medicinal plants.

The biobehavioural analysis of Gitksan use of plants for medicines confirmed traditional uses of 26 of 37 medicinal plants at Browner *et al.*'s Level I, similar use by at least one other group of people not in direct contact with the Gitksan for similar purposes. Only eleven of these plants were "validated" at their Level II or above, by either presence of active phytochemicals or clinical experience. These eleven plants included the six medicinal plants most frequently mentioned by Gitksan consultants. Data necessary for evaluation of efficacy of other medicinal plants used by the Gitksan often is incomplete or non-existant. If phytochemical and clinical studies of medicinal plants used by the Gitksan were more extensive, it is highly probable that the empirical efficacy of additional plant uses would be confirmed. In several cases, known activities of related plants are highly suggestive that the plants used by the Gitksan would be confirmed, but studies of the particular species used by the Gitksan have not been conducted (see Chapter 7 and Appendix 1).

In addition, several Gitksan food plants which are consumed in relatively large quantities may contain a number of active compounds and may have medicinal effects. These include several frequently eaten types of berries, particularly huckleberries and raspberries. Wild strawberries and low-bush or bog cranberries also contain a number of active phytochemicals.

Of interest is the relatively large number of potential medicinal plants which occur in the Gitksan environment which are not used by Gitksan people. Some seventy-seven plants which are used by various other cultural groups, and which are known to have active phytochemicals, are not used by the Gitksan. The same situation obtains for food plants; a plant may be used by one culture while regarded as inedible or even poisonous by another. Yellow pond lily rhizomes, for example, are harvested for food by some Native groups, while others, including the Gitksan, would regard them as inedible, but suited for medicine. What factors enter into the selection of medicinal plants from a large array of potential medicines remains unclear. I have speculated that understandings of what properties or plant parts are considered medicinal may enter in; whether one uses barks, for example, or leaves, or fruits, preferentially in the preparation of medicines. Whether purgation or cleansing or analgesia are considered desirable may also influence choices of plants to use for medicine. Cultural or symbolic factors undoubtedly also play a role, as well, perhaps, as salience or distinctiveness: the impressive spininess of devil's club, and the difficulty it presents when moving through the countryside create an undeniable impression of power. Its strongly aromatic properties are also very evident. As I have discussed, organoleptic qualities like taste and smell enter into both classification and evaluation of potential uses of plants. Bitter or aromatic compounds are often active compounds. The role of taste in food choices has been approached by various authors (cf Johns 1990), but remains elusive. Factors which shape cultural choices in plant use are complex and still largely unelucidated; the biobehavioural analysis I have undertaken suggests that the role of phytochemicals or physical properties is more to create possibilities, than to shape the specific choices that will be made.

Understanding of traditional plant uses and ecological knowledge provides basic information about human nutrition, potential medicinal plants, ethnomedicine, and ecological adaptations of different human groups. It also enhances understanding of the variability of cultural response to common conditions of illness and aging in different human environments. Understanding the meanings with which people invest their experience of land, of the plants and their properties, and of wellness and illness situates this knowledge, and illuminates the human experience.

Technological change and modernization are rapidly changing the conditions in which people live, with the result that traditional knowledge of plant utilization and healing practices is disappearing or changing rapidly, though persistence and continuity can also be seen. This process of change is certainly underway in the Skeena area of northwest British Columbia, where rapid social and environmental change impact Native communities and their relationship to other Canadians, transforming the meaning and context of traditional knowledge. Time also steadily eliminates much of the richness of this knowledge, as elders pass away, sometimes without managing to find younger people who have listened to and learned what they have to pass on.

I hope this work has been a contribution to the ethnobotanical, ecological, and ethnographic literature of the Northwest Coast, and of anthropology. It is my profound hope it will also make a contribution to the Gitksan people and their future, as they engage in the active process of sifting and recasting knowledge from their past to serve their present and future needs.

Notes

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[1] **Daxget** is also the name of the newsletter published by the Gitksan Office of Hereditary Chiefs, which deals with land claims and treaty negotiations, showing again the importance of the linkage of land and the power of the people.

[2] Morrell 1989 contains a discussion of fisheries issues. The Gitksan Strategic Watershed Analysis Team Sleeping Grizzly proposal and Madzi Ho'ot submission (Gitksan Treaty Office n.d. a,b) attest to the concern about forest harvest sustainability and lack of consideration of other resources. Appendix C to Daly n.d. in fact sets out an alternative sustainable Gitksan approach to forest management. The various Gitksan roadblocks (Monet and Ska'nu'u 1992; Mills n.d.) have also been responses to the perceived non-sustainability of forestry practices, and to the harm done to other species in the process of harvest. Non-indigenous anxieties about forestry sustainability have been repeatedly aired in *Forest Planning Canada*, and in the meetings of the Public Advisory Committees to the Kispiox and Kalum Forest Districts in the late 1970's through 1980's. Environmental groups such as Western Canada Wilderness, the Valhalla Wilderness Society, the Seven Sisters Society, and the Sierra Club have also attempted to raise public awareness of the non-sustainable nature of forestry practices in British Columbia.

[3] The results of this research project have contributed to some of this revival of plant knowledge among younger Gitksan through my participation in teaching modules of the territory management program, and making presentations to the Addiction Resource Worker Program and the Community Awareness and Prevention Workers in Hazelton. Beverley Anderson has also given workshops and presentations to various groups, including at the youth camps.

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Appendix 1
List of Consultants

The following Gitksan people all contributed to this study. Those marked with a star were interviewed by Beverley Anderson, who subsequently shared information with me.

Beverley Anderson
Abel Brown
Martha Brown *
Andy Clifton
Barbara Clifton
Judith Fitzpatrick
Elizabeth Good
Godfrey Good
David Green
David Gunanoot *
Heather Harris
Jeff Harris, Sr.
David Harris
Kathy Holland
Phillip Howard
Sadie Howard
Ernest Hyzims
Robert Jackson, Sr.
Ellen Johnson
Fred Johnson
Mary Johnson
Ross McCrae
Joanne McKay *
Mary MacKenzie *
Solomon Marsden
Kathleen Marsden
Peter Martin
Art Matthews, Sr.
Art Mathews Jr.
Kathleen Matthews
Josh McLean
Connie Milton
Mary Moore
Lester Moore
Norman Moore
Ray Morgan
Elsie Morrison
Gertie Morrison
James Morrison *
Sam Morrison *
Sophia Mowatt *

Victor Mowatt
Sadie Mowatt
Lottie Muldoe
Pete Muldoe
Lilac Russell *
Sharon Russell
Olive Ryan
Joan Ryan
Don Ryan
Priscilla Smith
Bertha Starr *
Neil Sterritt Sr.
Percy Sterritt
Agnes Travers *
Phillip Turner *
George Turner *
Gertie Watson *
Gloria Wesley
Stanley Williams
Elaine Wilson
Jeff Wilson
Marie Wilson
Stanley Wilson
Walter Wilson

Appendix 2
Detailed Validation Rating for Important Medicinal Plants and Plants with a Rating Greater Than I

Species: *Abies lasiocarpa*

Uses: cleanser

wound dressing: tannins, astringent

bornyl acetate-antibacterial action; also *Abies* spp. from Siberia show moderate-strong antibacterial activity against all species surveyed

arthritis-no known active chemicals or activities

tonic-probable antiviral activity and antibacterial activity from bornyl acetate; Siberian antibacterial activity

respiratory illness-probable antiviral activity and antibacterial activity from bornyl acetate; Siberian antibacterial activity

VALIDATION: cleanser : I (2/7)
wound dressing : III (4/7)
respiratory illness : III (5/7)
tonic: II (3/7)
arthritis : 0 (0/7)

Species: *Alnus crispa* ssp.*sinuata*

Uses: tonic- cleansing properties would be produced by genkwanin, present in the buds (see physic); antibacterial and antibacterial effects would be produced by quercetin, also documented for buds, but not bark

gonorrhoea/VD - lupeol is "antiurethrotic"; could be related to gonorrhoea use

cough-quercetin, present in buds, would be antiviral, antibacterial, antihistaminic, antiasthmatic, antiparyngitic, and effective against cough and respiratory illness, but it is not known if this is present in the bark as well as buds.

physic-buds have genkwanin which is purgative, but not known if bark also contains genkwanin

laxative-buds have genkwanin which is purgative, but not known if bark also contains genkwanin

VALIDATION: tonic-I (1/7)
gonorrhoea/VD I (1/7)
cough I(1/7)
physic I (1/7)

None of the uses of *Alnus crispa* can be validated above level I because it is not known if the potentially active chemicals occur in the plant parts used by the Gitksan, except for lupeol, for which the connection to effective treatment of veneral disease is somewhat tenuous.

Species: *Alnus incana* and *A. rubra*

Uses: skin conditions-*A. incana* buds have betuletol, quercetin and isorhamtetin, which are antihistaminic, antiinflammatory, bactericidal and pesticidal; *A. rubra* buds have acacetin and apigenin, which are antiallergic, antiinflammatory, antihistaminic and bactericidal. Also the strong antibacterial and antifungal activity found by McCutcheon et al. would suggest effective treatment of skin infections.

emetic and purgative : no purgative substances demonstrated

headache : no analgesic substances isolated; antihistaminic activity would be potentially helpful, but active chemicals not isolated from bark

unspecified : no active substances isolated from bark except lupeol, which is reported to show antitumor activity, probably insufficient to make an effective tonic or to be effective against infectious disease

VALIDATION: skin: III for both species (2/14) & (4/10)

emetic & purgative : I (2/14) & (2/10)

headache : 0

unspecified : I weak confirmation; (1/14) and (2/10) tonic

SPECIES: *Actaea rubra* (possible identification for "bear's berries", shade form with orange fruit")

Uses: wound dressing (post surgical): protoanemonin is reported to be antibiotic, antiseptic, antiviral and active against *Candida* (yeast), BUT clinical and toxicological reports show it to be vessicant and it is a strong irritant

VALIDATION: wound dressing: III? (2/15) (but weak identification certainty, and uncertain what negative effects vessicant properties would have in incision healing)

SPECIES: *Aralia nudicaulis* (possible identification for "bear's berries", shade form with orange fruit"; *A. nudicaulis* is the identification of the ordinary "bear's berries")

Uses: wound dressing (post surgical): alkaloids are reported in the rhizomes and leaves, but the activities of these alkaloids are unknown. Also triterpenoids of unknown activity; alpha-amyrin is cytotoxic and antitumor Siberian species of *Aralia* shows weak anti-bacterial activity (Moskalenko 1986)

VALIDATION: wound dressing: I (1/6)
Chemicals known to occur in rhizomes are not effective for wounds, and it is not known whether *A. nudicaulis* shows antibacterial activity.

Species: *Cornus stolonifera*

Uses: fractures : poultice -not confirmed at level I because the uses by other groups are dissimilar; however, the antiinflammatory properties of hyperin could help heal a fracture, or enhance the comfort of the patient. Hyperin also enhances capillary formation, which could be useful for healing.

VALIDATION: fractures: 0 (0/23) (but 1/15 (sprains) for related spp. and see above)

Species: *Equisetum arvense*, *E. hiemale*, *E. pratense*, *E. variagatum*

Uses: kidney/bladder conditions: *E.a.* contains kaempferol, naringenen oxalic acid and *p*-hydrobenzoic acid, which are all diuretic, bactericidal, and antiinflammatory. *E. arvense* and *E. hiemale* both contain ferrulic acid and caffeic acid, which are spasmolytic.

For *E. a.* and *E. h.*, 11/19 records of use by other groups confirmed the Gitksan use. *E. sylvaticum* is also used by 2/2 groups for urinary problems.

VALIDATION: Kidney/bladder conditions: for *E. arvense* III (or even IV if European herbology practice can be considered clinical confirmation) (3/5)

Kidney/bladder conditions : for *E. hiemale* II or III (8/14) (probably effective because it would relieve spasm and inflammation in cystitis, but it would not effect pathogens or kidney filtration based on known chemicals and activities);

Kidney/bladder conditions : I (1/2) Not enough is known of the chemistry of *E. pratense* or *E. laevigatum* to allow validation at greater than I.

Species: *Juniperus communis* and *J. scopulorum*

Uses: smudge: various compounds used in perfumery; use for spiritual and non-material purposes. Use confirmed by 1/27 other groups.

respiratory illness: extracts of *J. communis* showed moderately strong bacterial inhibition of all species tested (McCutcheon et al 1992). Numerous active chemicals are found in "berries" and other parts of the plant, including-umbelliferone (antihistaminic, antiseptic, fungicide), camphene (spasmogenic), camphor(analgesic, anesthetic, aexpectorant, antitussive, antihistaminic, myrcene (bactericidal), delta-3-carene ("berries"-antiinflammatory and bactericidal), alpha-pinene and limonene (antiviral, influenza virus), rutin (antiviral), borneol (analgesic, antiinflamatory, febrifuge, spasmolytic),and citronellol (bactericidal, sedative); limonene, alpha-pinene and rutin are also known to be anti-nephritic or nephrotoxic, which corresponds to the known kidney damaging effects which *J. communis* extracts can produce (Oates pers. comm 1987). No information was located on *Juniperus scopulorum* phytochemicals or bioassays.

tonic: in addition to the effects shown above, umbelliferone has colorectic, fungicidal, lipoxygenase inhibitory properties; camphor is antifibrinositic; rutin is antiedemic, antidiabetic, anticancer and cancer preventative, antiatherogenic, and hepatoprotectant; citronellol is candidicidal, and fungicidal, which would have diverse health-promoting effects. No information was located on *Juniperus scopulorum* phytochemicals or bioassays.

VALIDATION: smudge : NA (1/27); (2/27)

respiratory illness : III (10/27) *Juniperus communis*,;
I *J. scopulorum* (5/16)

tonic : III (9/27);*J. communis*; I (3/16) *J. scopulorum*

Species: *Ledum groenlandicum*

Uses : tonic-vitamins and calcium could contribute to tonic effect and disease prevention, especially scurvey and respiratory illnesses; possible purgative effects due to ledol; narcotic substances also reported-sedative effects? andromedotoxin unlikely to be therapeutic, but probably not toxic either unless large dose of strong decoctions of labrador tea are taken

heart: no substances are reported which would benefit heart or circulatory function

arthritis : no substances are reported which are likely to benefit arthritic conditions

VALIDATION- tonic : level I (4/20); weak evidence of possible tonic effects of known constituents

heart : I (3/20)

arthritis : I (3/20)

Species: *Lonicera involucrata*

Uses: eye medication- no chemical characterization of *Lonicera involucrata* is reported in the literature. Tannins are known to be present in the genus, and some species have monodesmoside saponins. No positive bioassays for antibacterial activity reported; McCuthcheon *et al.* 1992 found no actvity in extracts from this species, although antibacterial activity was demonstrated in Siberian *Lonicera* spp. (Moskalenko 1986).

VALIDATION- eye medication : I (2/13)

Species: *Nuphar polysepalum* (=*L. lutea* ssp. *polysepalum*)

Uses: tuberculosis- strong antibacterial activity demonstrated in methanol extracts by McCutcheon *et al* 1992, especialy against *Mycobacter phlei* , which suggests effectiveness against *Mycobacterium tuberculosum*. The fact that anti-TB medications were taken orally on a daily basis for prolonged periods would enhance the likelihood of effectiveness, because modern oral TB medications must be taken without pause for a prolonged periods to keep TB from recurring.

fractures, sores, swelling: no chemicals which have antiinflammatory or other relevant properties are known to occur in *N. polysepalum* although relatively high levels of ß-sitosterol are known to occur in *Nymphaea odorata*, the white water lily. If similarly present in high amounts in *Nuphar polysepalum*, it might show topical antiinflammatory properties. Nupharine an alkaloid isolated from *N. lutea*, shows spasmolytic and hypotensive properties. This would not aid in reducing swelling and promoting healing.

appetite stimulant: none of the chemicals known to occur would affect appetite directly, although spasmolytic properties might reduce nausea and therefore promote desire to eat

contraception : although this use was not validated by other groups, male contraception might be effective if sufficient ß-sitosterol were present in *Nuphar* rhizomes (see fractures, sores & swelling, above). This potential use cannot be validated until better characterization of *N.polysepalum* rhizomes is undertaken.

VALIDATION: tubercolosis medicine: III (5/10)
poultice for fractures, sores, swellings: I (5/10)
appetite stimulant : I (weak; 1/10 for stomach ulcers)
contraception : 0

Species: *Oplopanax horridus*

Uses- respiratory illnesses:although the chemicals occurring in the bark of *Oplopanax* are not well characterized, the antibacterial activity demonstrated for methanol extracts of the bark by McCutcheon et al 1992 make it likely that devil's club decoctions or infusions could be effective in treating bacterial respiratory infections, including tuberculosis (strong *Mycobacter phlei* inhibition).

purgative properties: no information on chemicals which might contribute to purgative or laxative properties was located.

fumigant or purification: insofar as the aim of these uses is not material, chemical composition is not directly relevant to assessing the efficacy of devil's club

diuretic : no information on chemicals which might contribute to diuretic or kidney toning effects was located.

stomach ailments: the antibacterial activity against *Salmonella typhimurium* demonstrated by McCutcheon *et al* 1992 was the only factor likely to produce effects on stomach ailments

wound dressing : the antibacterial properties of devil's club extracts would prevent infection of wounds; the usual use of fresh material in direct contact with the wound would likely allow the antibacterial components to be active in the wound area

skin wash and scent remover: the use of devil's club for skin wash and scent removal, overtly part of spiritual purification and hunting luck rituals, would likely prevent bacterial skin conditions like impetago, caused by *Staphylococcus* or *Streptococcus*.

diabetes treatment : clinical evidence collected in the 1930's demonstrated hypoglycaemic effects of devil's club extracts (Brocklesby & Large, Justice 1966), but other clinical studies failed to support these findings (Smith 1983).

cancer prevention or treatment (early phases): no cancer-preventive or tumor-inhibiting chemicals are known to occur in devil's club

tonic : antibacterial properties might aid in prevention of bacterial diseases

arthritis treatment : no known antiinflammatory or analgesic compounds occur in devil's club.

Oplopanax horridus, cont.

VALIDATION: respiratory illnesses : II or III (14/33)

purgative properties: I (7/33)

fumigant or purification: N/A

diuretic : ?I (1/33-high blood pressure)

stomach ailments : I (2?/33)

wound dressing: III (5/33)

skin wash and scent remover : I(4/33)

diabetes treatment : I or IV? (5/33)

cancer prevention or treatment (early phases): I 4(33)

tonic: I (6/33)

arthritis: I (13/33)

Species: *Picea* x *lutzii*
(hybrid swarm of *P. sitchensis*, *P. engelmannii*, and *P. glauca* found in the Skeena Valley in the Kitwanga-Hazelton area)

Use: tonic, respiratory illness, wound dressing, burns : strong bacterial inhibition against *E. coli*, *Staphylococcus aureus Pseudomonas aeruginosa*, and strong antifungal activity against *Candida albicans* and *Aspergillis fumigatus* reported from *Picea engelmannii* x *glauca* pitch (Ritch-Krc *et al.* 1996). The European species *P. abies* is the source of commercial "pine oil" and has strong antibacterial and anti-candida activity, comparing favorably with chloramphenicol (Kartnig 1991). The bark is known to contain tannins, which would have topical astringent properties, useful in burn treatment.

VALIDATION : tonic-II (1/18-but possibly not independant)
respiratory illness: II or III (8/18)
wound dressing : II or III (10/18)
burns : 0 (0/18, but see above)

Species: *Pinus contorta*

Uses: colds and respiratory illness: moderate anti-bacterial activity (bark extracts; McCutcheon et al 1992; pitch Ritch-Krc *et al.* 1996). Limonene is sedative and spasmolytic, antiviral, "antipharyngitic",and quercetin is antihistamine. Tips for colds-quercetin, isorhamnetic are antihistaminic, antiinflammatory and spasmolytic.

wounds, sores, burns. bark-anti-bacterial activity; quercetin (bark) is anti-herpes, antihistaminic and antidermatitic; limonene (oleoresins) is bactericidal and virucidal

"sickness"-bark extracts are antibacterial, alpha-pinene, limonene and quercetin are antiflu, and quercetin adn bornyl acetate are anti-viral

VALIDATION: colds and respiratory illness :III (8/13)
wounds, sores, and burns: III (7/13)
"sickness" : II (2/13, including flu and "weakness)

Species: *Populus tremuloides*

Uses: purgative and cleanser (mixed decoction) : no active chemicals of a purgative nature reported for aspen, but other plants in the mixture may be contributing purgative chemicals. The known active chemical in *Populus tremuloides*, salicin, has analgesic properties, and is anti-viral, antipodagric (= relieves gout of the foot), antirheumatic, sedative, stomachic, tonic, and uterorelaxant. None of these properties obviously relate to cleansing functions, although if the mixture also acts as a tonic, they might might contribute to its effectiveness.

VALIDATION: purgative and cleanser: I? (1?/19)

Species: *Prunus pensylvanica*

Uses: cough- not enough is known about the phytochemicals of *P. pensylvanica* bark, or its antibacterial or other properties to validate the Gitksan use. It is highly suggestive that the related *P. virginiana* and *P. serotina* contain compounds that are antitussive and spasmolytic, and have been used clinically in the manufacture of cough medications.

tonic: no information on tonic properties of the bark or its constituents was located.

VALIDATION:cough: I (5/6)

tonic: 0 (no confirming records)

Species: *Sambucus racemosa*

Use: emetic (cleanser for flu and inability to eat): "purgative chemicals" in bark, roots listed as most toxic part (Kingsbury 1964). Also cyanogenetic glycosides. Lampe & McCann 1985 state that poisoning by elderberry species produces severe diarrhea. The phytochemical and clinical data mention purgative rather than emetic effects, but the Gitksan cold infusion was followed by drinking warm water until vomiting stopped (multiple episodes); the drinking of warm water is likely to lead to emesis. Also, the clinical report of *S mexicana* poisoning cited in Lampe & McCann (1985) mentioned nausea from juice of stems and berries, suggesting that elderberry preparations might indeed be emetic.

VALIDATION: emetic : II or ?IV (see above) (8/18)

Species: *Smilacina racemosa*

Uses:sore back- no known counterirritant or analgesics, diuretics to restore kidney function, or antilithic compounds to dissolve kidney stones

purgative- no known purgative compounds

kidney ailments- no known diuretics to restore kidney function, or antilithic compounds to dissolve kidney stones

wound treatment tannins are present, which could have an astringent effect in wound treatment.

VALIDATION: sore back: I (2/20)
purgative : I (1/20)
kidney ailments: I (1/20)
wound treatment: I (2/20)

Species: *Sorbus scopulina* and *S. sitchensis*

Uses: tonic: no information was available on the phytochemistry, activities or properties of *S. scopulina* or *S. sitchensis*. The chemicals present in *S. acuparia* are suggestive of possible tonic properties eg, amygdalin is antiinflammatory, antitussiive, cancer-preventative, gallic acid is anti-carcinomic, antiseptic, antiviral, bacteristatic, ursolic acid is antidiabetic, antileukemic, hepatoprotective, and so on. Some toxic effects are also present in *Sorbus acuparia* phytochemicals.
respiratory illness : no information was available on phytochemistry or activitiues of *S. scopulina* or *S. sitchensis*. As with tonic properties, the chemicals found in *S. acuparia* are suggestive (antitussive, antiinflammatory, antispetic, antiviral, bacteristatic, and so on). The two Siberian species of *Sorbus* assayed by Moskalenko (1986) do show strong antifacterial properties.
Physic: no known purgative chemicals are reported for *S. acuparia*.

VALIDATION: tonic: I (1/9)
respiratory illness I (3/10) (+1fever)
physic : I? (1 labour aid)
Gitksan uses cannot be validated without evidence from the northwestern species of *Sorbus*.

Species: *Veratrum viride*

Uses: skin ailments: chemicals present in the roots of *V. viride* have anti-louse and fungicidal properties which would make them effective treatment for some types of skin conditions

boils and swellings: chemicals present in the roots ahave analgesic and counterirritant effects; rhizomes have fewer known active chemicals

aches, pains (topical): roots and leaves have analgesic and counterirritant chemicals

lung hemorrhage (topical, mixed poultice): a mixed poultice has properties deriving from all its components; *Veratrum* could act as a local analgesic and counterirritant, but it is unclear how it might stop hemorrhage unless compounds which lower blood pressure are absorbed transdermally and might lessen the bleeding.

VALIDATION: skin ailments: II or III (5/20)
boils and swellings : II (3/20)
aches and pains, topical : II (7/20)
lung hemorrhage, topical: 0 (0/20)
fumigant: N/A (2/20)
protection: N/A (4/20)
wash: N/A(2/20)

Species: *Viburnum edule*

Uses: cough : no phytochemical data or assays were located for *V. edule*. The chemicals in the related species *V. prunifolium* and *V. opulus* strongly suggest antispasmodic and uterine sedative properties. Bioassays from Siberian species suggest likely antibacterial activities, particularly against *Staphylococcus aureus*, *Escherichia* spp., and *Mycobacterium smegmatis* (related to *M. tuberculosis*). Scopoletin, found in the eastern north American *Viburnum* species, is used in cough preparations.

headache: no record of analgesic or antihistamine properties in the genus was located.

VALIDATION: cough : I (4/5)
headache : 0 (0/5)

Phytochemical data and bioassays from *V. edule* are needed to validate Gitksan uses; the uses of eastern species recorded in Moerman and Arnason differ from those given for western species, so the chemistry of the western species may differ, giving different properties to its preparations.

Appendix 3
Phytochemicals and Activities of Selected Medicinal Plants Occurring in Northwest BC Which Are Not Utilized by the Gitksan

Potential clinically useful properties are indicated by underlining; potentially toxic or undesirable activities are shown by use of *italics*. Hormonal activities affecting reproduction shown with double underline. Properties whose clinical relevance is not clear to me are left unmarked. Other properties (shown in parenthases). Properties taken from Beckstrom-Sternberg and Duke (1994) unless otherwise referenced.

Salix spp. (*Salix alba*)
Willow

apigenin	antiaggregant, antiallergic, antiestrogenic, antihistaminic
bark	antiinflammatory, antimutagenic, antioxidant, bactericide, calcium blocker?, cancer-preventative, choleretic, diuretic, hypotensive and vasodilator, musculotropic, myelorelaxant, nodulation-signal, (pesticide), sedative, spasmolytic
catechin	(allelochemic), antialcoholic, antiarthritic, anticariogenic,
plant	antiendotoxic, antifeedant, antiflu, antiherpetic, antiviral, and virucidal, antihepatitic, antihepatotoxic and hepatoprotective, antihyperlipedemic, and hypocholesterolemic, antioxidant, antiradicular, antiperiodontal and antiplaque, antisclerodermic, antiulcer, astringent, cancerpreventative but *carcinogenic*, fungicidal, hemostat, immunostimulant, lipoxygenase-inhibitor, (pesticide)
isoquercitrin	*antifeedant*, cancer-preventative, capillarigenic, diuretic,
bark	hypotensive, (pesticide)
p-coumaric acid	antineoplastic, bactericide, cancer-preventative, choleretic,
plant	lipoxygenase-inhibitor, (pesticide), prostaglandin synthesis inhibitor
quercetin bark	5-lipoxygenase inhibitor, aldose-reductase inhibitor, (allelochemic), anti-tumor promotor, anti-Crohn's, anti-PMS, antiaggregant, antiallergic, antianalhylactic, antiasthmatic, anticataract, anticolitic, antidermatitic, antidiabetic, antiestrogenic, *antifeedant*, antiflu, anti-rabies, antiherpetic, antipolio, antiviral, HIV reverse transcriptase inhibitor, *antigastric*, antihepatotoxic, antihistaminic and antiinflammatory, antileukotrienic,

Salix spp. cont.

quercetin, cont .	antilipoperoxidant, antioxidant, antiperiodontal and antiplaque, antipermeability, antipharyngitic, antipodriac, antisporiac, antitumor, antiradicular, bactericide, calmodulin-antagonist, cancer preventative, protects capillaries, cyclooxygenase-inhibitor, *cytotoxic*, hypoglycemic, insulinogenic, (juvabional, larvistat, pesticide), lipoxygenase inhibitor,mast-cell stabilizer, *mutagenic*; spasmolytic, *teratologic*, *tumorigenic*, vasodilator, xanthine oxidase inhibitor, CAMP phosphodiesterase inhibitor
rutin bark	aldose reductase inhibitor, anti-capillary fragility, anti-tumor promoter, antiapoplectic, antiatherogenic, anticataract, antidermatitic, antidiabetic, antiedemic, antierythremic, *antifeedant*, antihistaminic, antiinflammatory, *antinephritic*, antioxidant, antipurpuric, antithrombogenic, antitumor, antiviral, cancer-preventative, capillary protective, hypotensive, (juvabional, larvistat, pesticide) spasmolytic, vasopressor, CAMP phosphodiesterase inhibitor
salicin 2.5-11% bark	analgesic, antiaggregant, *antifeedant*, antiinflammatory, antineuralgic, antiperiodic, antipodagric, antipyretic, antirheumatic, (pesticide), sedative, stomachic, *teratogenic*, tonic, uterorelaxant
salicortin leaf	analgesic
salicylic acid plant	analgesic, antidermatotic, antieczemic, antiicthyosic, anti-inflammatory, antineuralgic, antionchomycotic, antipyretic, antirheumatic, antiseborrheic, antiseptic, antitympanitic, bactericidal, cancer-preventative, comedolytic, febrifuge, fungicide, keratolytic, (pesticide), tineacide, *ulcerogenic*
tannin 5-7% bark	antidiarrheic, antidysenteric, antimutagenic, *antinephritic*, antioxidant, antiradicular, antiviral, bactericide, cancer-preventative, hepatoprotective, (pesticide), *psychotropic*, viricide.
triandrin plant	anti-hypnotic, stimulant

Arctostaphylos uva-ursi
Kinnikinnik or bearberry

allantoin plant	antiinflammatory, antipeptic, antipsoriac, antiulcer, immunostimulant, keratolytic, superative, vulnerary
arbutin 5-12% leaf	antiseptic, antitussive, artemicide, bactericide, candidicide, diuretic, insulin sparing, (pesticide), urinary-antiseptic
alpha-amyrin	antitumor, *cytotoxic*
ß-sitosterol	androgenic, *anorexic*, antiadenomic, antiandrogenic, *antifeedant*, antifertility, antigonadotrophic, antiinflammatory, antileukemic, antimutagenic, antiprogestational, antiprotastadenomic, antiprostatiitic, antitumor, antiviral, artemicide, bactericide, cancer-preventative, candidicide, estrogenic, gonadotrophic, hepatoprotective, hyopcholesterolemic, hypoglycemic, hypolipedemic, (pesticide), spermicide, viricide
betulinic acid	antitumor, *cytotoxic*
citric acid leaf	antiaphthic, anticalculic, anticoagulant, antioxidant, antitumor, disinfectant, hemostat, litholytic, refrigerant
formic acid leaf	antiseptic, antisyncopic, counterirritant, (pesticide)
gallic acid plant	ACE inhibitor, anticarcinomic, antifibrinolytic, antioxidant, antiseptic, antiviral, astringent, bacteristatic, cancer-preventative, but *carcinogenic*, hemostat, *nephrotoxic*, (pesticide), styptic
hyperin leaf	antiinflammatory, antioxidant, antitussive, antiviral, capillary fortifier, capillarigenic, diuretic, hepatoprotective, hypotensive, (pesticide), viricide
isoquercitrin leaf	*antifeedant*, cancer-preventative, capillarigenic, diuretic, hypotensive, (pesticide)
lupeol plant	antitumor, antiurethrotic, *cytotoxic*
malic acid leaf	bacteristat, bruchiphobe, hemopoietic, (pesticide), sialagogue

Arctostaphylos uva-ursi , cont.
Kinnikinnik or bearberry

monotropein leaf	cathartic
myricetin leaf	*antifeedant*, *antigastric*, antiinflammatory, cancer preventative, diuretic, (larvistat and pesticide)
oleanolic-acid plant	*abortifacient*, anticariogenic, antifertility, antihepatotoxic, antisarcomic, cancer-preventative, cardiotonic, diuretic, hepatoprotective, uterotonic
quercetin leaf	5-lipoxygenase inhibitor, aldose-reductase inhibitor, (allelochemic), anti-tumor promotor, anti-Crohn's, anti-PMS, antiaggregant, antiallergic, antianalhylactic, antiasthmatic, anticataract, anticolitic, antidermatitic, antidiabetic, antiestrogenic, *antifeedant*, antiflu, antirabies, antiherpetic, antipolio, antiviral, HIV reverse transcriptase inhibitor, *antigastric*, antihepatotoxic, antihistaminic and antiinflammatory, antileukotrienic, antilipoperoxidant, antioxidant, antiperiodontal and antiplaque, antipermeability, antipharyngitic, antipodriac, antisporiac, antitumor, antiradicular, bactericide, calmodulin-antagonist, cancer preventative, protects capillaries, cyclooxygenase-inhibitor, *cytotoxic*, hypoglycemic, insulinogenic, (juvabional, larvistat, pesticide), lipoxygenase inhibitor,mast-cell stabilizer, *mutagenic*, spasmolytic, *teratologic*, *tumorigenic*, vasodilator, xanthine oxidase inhibitor, CAMP phosphodiesterase inhibitor
quinic acid	choleretic
tannin 6-20% bark	antidiarrheic, antidysenteric, antimutagenic, antinephritic, antioxidant, antiradicular, antiviral, bactericide, cancer-preventative, hepatoprotective, (pesticide), *psychotropic*, viricide.
ursolic acid	antidiabetic, antiinflammatory, antileukemic, antiobesity?, antitumor, *CNS depressant*, cancer-preventative, *cytotoxic*, diuretic, hepatoprotective, hypoglycemic, (piscicide)
uvaol	antitumor, *cytotoxic*

Chimaphila umbellata,
Pipsissewa or Prince's Pine

arbutin 7.5% leaf	antiseptic, antitussive, artemicide, bactericide, candidicide, diuretic, insulin sparing, (pesticide), urinary-antiseptic
avicularin	aldose-reductase inhibitor, antibiotic, diuretic, (pesticide)
ß-sitosterol	androgenic, *anorexic*, antiadenomic, antiandrogenic, *antifeedant*, antifertility, antigonadotrophic, antiinflammatory, antileukemic, antimutagenic, antiprogestational, antiprotastadenomic, antiprostatiitic, antitumor, antiviral, artemicide, bactericide, cancer-preventative, candidicide, estrogenic, gonadotrophic, hepatoprotective, hyopcholesterolemic, hypoglycemic, hypolipedemic, (pesticide), spermicide, viricide
chimaphilin 0.2% plant	(allelochemic), bactericide, (pesticide),urinary-antiseptic
epicatechingallate	cancer-preventative, xanthine oxidase inhibitor
hyperoside	antidermatitic, antiflu, antiviral,viricide, antiinflammatory, cancer-preventative, fortifies capillaries, capillarigenic, diuretic, hypotensive, (pesticide), CAMP phosphodiesterase-inhibitor
kaempferol	5-lipoxygenase inhibitor, antitumor promoter, *antifertility*, *mutagenic*, *teratologic*, antihistaminic, antiinflammatory, antioxidant, antiulcer, cancer-preventative, choleretic, cyclooxygenase inhibitor, diuretic, natriuretic, HIV reverse transcriptase inhibitor, hypotensive, spasmolytic
methyl salicylate	*allergenic*, analgesic, antiinflammatory, antypyretic, antiradicular, antirheumatologic, cancer-preventative, carminative, counterirritant
nonacosane	antimutagenic, antiviral
tannin 4% plant	antidiarrheic, antidysenteric, antimutagenic, *antinephritic*, antioxidant, antiradicular, antiviral, bactericide, cancer-preventative, hepatoprotective, (pesticide), *psychotropic*, viricide

Chimaphila umbellata, cont.
Pipsissewa or Prince's Pine

ursolic acid	antidiabetic, antiinflammatory, antileukemic, antiobesity?, antitumor, *CNS depressant*, cancer-preventative, *cytotoxic*, diuretic, hepatoprotective, hypoglycemic, (piscicide)
(-)-carvone essential oil	acetylcholinesterase inhibitor, anti-Alzheimerian?

Mentha arvensis
wild mint, field mint

1,8-cineole	(allelopathic) anesthetic, antibronchitic, anticatarrh, antilaryngitic, antipharyngitic, antirhinitic, antiseptic, antitussive, bactericide, CNS-stimulant, choleretic, counterirritant, dentifrice, expectorant, fungicide, liver toner, hypotensive, (insect repellant and pesticide), rubifacient, sedative
acetic acid plant	acidulant, antiototic, antivaginitic, bactericide, expectorant, fungicide, mucolytic, *osteolytic*, (pesticide), protistacide, *spermicide*, *ulcerogenic*, verrucolytic
alpha-pinene plant 10-300 ppm	antiinflammatory, cancer-preventative (coleoptiphile, insectifuge, insectiphile, pesticide)
camphene	*spasmogenic*
carvone leaf 0.81-2.6%	antiseptic, CNS stimulant, cancer-preventative, carminative (insecticide, insect repellant, pesticide) vermicide
caryophyllene plant	antiedemic, antiinflammatory (insect repellant, perfumery, pesticide, termitifuge) spasmolytic
eugenol essential oil	analgesic, anaesthetic, antiaggregant, antiedemic, *antifeedant*, antiinflammatory, antioxicant, antiprostaglandin, antiseptic, antiulcer, cancer-preventative, candidicide,choleretic, *cytotoxic*, febrifuge, fungicide, (apifuge, insectifuge, juvabional, larvicide, pesticide, herbicide), *irritant*, *ulcerogenic* , vermifuge
formic acid plant	antiseptic, antisyncopic, counterirritant, (pesticide)

Mentha arvensis, cont.
wild mint, field mint

furfural plant 2-5ppm	antiseptic, fungicide (insecticide, pesticide)
hesperidin plant	*antiDNA*, *antiRNA*, antiallerginic, antioxidant, antistomatitic, antiviral, capillariportective, choleretic (pesticide), vasopressor
limonene leaf 20-3520 ppm	acetylcholinesterase inhibitor--anti-Alzheimerian?, anticancer, antilithic, antiviral, viricide, bactericide, cancer-preventative, (herbicide, insecticide, insect repellant, pesticide), *irritant*, sedative, spasmolytic
linalool leaf	antiseptic, antiviral and viricide, bactericide, cancer-preventative, fungicide, (insect repellant, perfumery, pesticide, termite repellant), sedative, spasmolytic, *tumor-promoter*
luteolin shoot	aldose-reductase inhibitor, *antifeedant*, antihistaminic, antiinflammatory, antioxidant, antitussive, cancer-preventative, choleretic, diuretic, (pesticide), spasmolytic, xanthine oxidase inhibitor
menthol leaf 1,000-24,385 ppm	*allergenic*, analgesic, anaesthetic, antibronchitic, antiinflammatory, antineuralgic, antiodontalgic, antipruritic, antirheumatic, antiseptic, antisinusitic, bradycardic, bronchomucolytic, bronchorrheic, *CNS depressant*, calcium-antagonist?, carminative, counterirritant, gastrosedative, myelorelaxant, (perfumery, pesticide), rubifacient, spasmolytic, vibriocide
menthone plant 71-24,000 ppm	analgesic, antiseptic, cancer-preventative, sedative, spasmolytic
myrcene leaf 10-2,485 ppm	analgesic, antimutanegic, antinociceptive, bactericide (insect repellant, insecticide, pesticide) spasmolytic
p--cymene leaf, 9-29ppm	analgesic, antiflu, antiviral and virucide, antirheumatologic, bactericide, fungicide (herbicide, insect repellant, pesticide)
piperitone leaf, 13-1285 ppm	antiasthmatic

Mentha arvensis, cont.
wild mint, field mint

pulegone plant 100-24460 ppm	antiacetylcholinesterase inhibitor--anti Alzheimerian?, antihistaminic, antipyretic, cancer-preventative, *cerebrotoxic, hepatotoxic* (avifuge, herbicide, insecticide and insect repellant, pesticide), flea repellant, sedative
rosmarinic acid plant 28,000 ppm leaf 71-228 ppm	antianaphylactic, anticomplementary, antiedemic, *antigonadotrophic*, antihepatotoxic, antiherpetic, antiviral, viricide, antiinflamatory, antileukotrienic, antilipoperoxidant, antioxidant, antiradicular, antishock, antithreotropic, bactericide, cancer-preventative, (pesticide)
thujone plant	*cerebrodepressant*, *convulsant, epileptigenic, hallucinogenic*, (herbicide, pesticide), *respirainhibitor*, spasmolytic